HARTCROWSER

Site Hazard Assessment
Gorst Landfill
Gorst, Washington

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SITE HAZARD ASSESSMENT
GORST LANDFILL
GORST, WASHINGTON

1.0 INTRODUCTION

This report presents the results of a Site Hazard Assessment (SHA) for the Gorst Landfill (Bremerton Auto Wrecking Yard Landfill) located along State Route 3 SW near Gorst, Washington (Figure 1). The Washington State Department of Ecology (Ecology) SHA process is designed to provide sufficient sample analytical data and other information to evaluate potential environmental and public health hazards at specific sites. This information is then used by Ecology to rank the site according to the Washington Ranking Method (WARM). Investigations completed for the SHA included a survey of the physical boundaries and characteristics of the landfill property, and sampling and analysis to evaluate potential impacts from the landfill to surrounding environmental media. Hart Crowser completed this work for the Department of the Navy, Engineering Field Activities, Northwest (EFA, NW), under Contract No. N44255-98-D-4408, Delivery Order No. 12.

The body of this report describes the project objectives, current and historical land use, investigation observations and findings, conclusions, and recommendations. Appendix A provides a Title Report for the subject property ordered under this scope of work. Appendix B summarizes the field procedures and data collected during sampling. Appendix C presents the chemical data quality review and laboratory certificates of analysis for samples collected and analyzed for this SHA.

2.0 PROJECT OBJECTIVES

The objective of this project was to investigate the physical and chemical characteristics of the Gorst Landfill and surrounding area to determine potential impacts to other properties and environmental media. The investigation of physical features included a property boundary and elevations survey, limited landfill soil and slope stability assessment, and characterization of area hydrogeology. The environmental investigation was conducted to provide sufficient data and other information to complete a SHA for the Gorst Landfill in accordance with requirements of the Model Toxics Control Act (MTCA) (WAC 173-340-320). The information provided in the SHA will be used by Ecology to rank the site using WARM.

Hart Crowser completed the following tasks toward fulfillment of the stated project objectives.

Property Boundary and Topography Survey. Hart Crowser obtained a Title Report for the landfill property from Pacific Northwest Title, as provided in Appendix A. Using the Title Report and Kitsap County agency records, Bush, Roed, and Hitchings conducted a survey of the boundaries and topography of the landfill property, installed monuments for further reference points, and provided markers for establishing an existing easement for access to the landfill through a neighboring property. The survey data were converted into electronic Geographic Information System (GIS) files for the subject property. Electronic boundary and elevation plans were modified for use and reference in this document. Figure 2 provides a property boundary plan for the landfill site. Figure 3 illustrates physical features of the landfill property and surrounding area.

Soil and Slope Stability Assessment. Based on a history of landslides from the north face of the landfill, Hart Crowser conducted a limited soil and slope stability assessment to verify that proposed field activities could be safely executed and to determine the potential for future slides. The assessment included a review of site topography as provided by the Bush, Roed, and Hitchings survey and a one-day site investigation by Hart Crowser geotechnical engineers.

Hydrogeology Assessment. Hart Crowser conducted a limited review of area hydrogeologic conditions based on groundwater data for existing wells, area reports, and USGS records to characterize groundwater flow in the vicinity of the landfill.

Environmental Media Sampling and Analysis. Hart Crowser collected surface soil samples from the landfill mass, and surface soil, groundwater, surface water, and freshwater sediment samples from surrounding properties for chemical analysis. Samples were analyzed for various constituents based on historical information regarding the types of materials potentially present in the landfill.

Assessment of Impacts to Fisheries. Using data obtained from sampling and analysis of environmental media, Hart Crowser evaluated the potential for resource damage from the landfill, limited to impacts to a fish hatchery located downstream on Gorst Creek. The limited assessment consisted of an evaluation of sample analytical data and freshwater sediment and surface water quality standards, with a consideration of the location of the landfill relative to the fish hatchery.

3.0 CURRENT AND HISTORICAL LAND USE

3.1 Current Site Conditions

The Gorst Landfill is located approximately 1.5 miles west of Gorst, Washington, along the southeast side of State Highway 3 SW, as shown on Figure 1. The Kitsap County Tax Assessor identifies the landfill property as parcel 012301-4-022-1005, located in the NE 1/4 of the SE 1/4 of Section 1, Township 23 North, Range 1 West (WM) in Kitsap County, Washington. The property is further delineated in the Title Report provided in Appendix A, and on the Site Property Boundary Plan provided on Figure 2.

The landfill site has historically been associated with an auto wrecking yard listed at 4275 State Route 3 SW, Port Orchard, Washington. In 1989, a "Declaration of Property Line Adjustment" was filed in Kitsap County to separate the land containing the landfill property from the adjacent auto wrecking yard. As of that date, separate parties have owned the Gorst Landfill property and the adjacent auto wrecking yard. Vehicle access to the landfill property can only be obtained through the adjacent auto wrecking yard, Airport Auto Wrecking, Too. The 1989 property line adjustment created an easement through the auto wrecking yard, which may be cleared to provide access to the landfill for future site activities. The easement is labeled "Ingress, Egress & Utilities Easement, Rec. No. 883956," as illustrated on Figure 2.

The Gorst Landfill property is a triangular parcel centered over approximately 700 feet of the Gorst Creek ravine (See Figure 3). Gorst Creek is an intermittent stream flowing through a ravine that ranges between 60 and 80 feet deep over the length of the subject property. The creek ravine was first used as a landfill site in approximately 1968, at which time a concrete culvert was constructed to carry creek water through and under landfilled materials. Waste materials and soil cover were deposited in the ravine from 1968 until the landfill closed in the late 1980s. During the landfill operation, the culvert functioned adequately during dry periods and moderate rain events, but was incapable of handling large volumes of water during heavy rains.

Currently, the Gorst Creek ravine on the subject property contains an estimated 150,000 cubic yards of waste and soil cover. The top of the landfill is flush with the surrounding topography over much of the landfill mass, and is overgrown with small trees, blackberry bushes, and other vegetation. During severe rainfall events between January and February of 1997, water in the Gorst Creek ravine backed up behind the landfill mass and eventually spilled over the top and down the north face. The north face of the landfill mass slid, resulting in a release of soil and debris to Gorst Creek. In addition, the landfill slide left a steep and unstable face with exposed debris on the north end of the landfill. The approximate slide area is illustrated on Figure 3. It is feared that future landfill slope failure could threaten State Route 3 SW, located less than 300 feet down slope of the north landfill face. The south face of the landfill appears to remain intact with a gradual slope. Exposed debris is visible on both the north and south faces of the landfill.

The Washington State Department of Transportation (WSDOT) owns the property directly north of the landfill site, which contains State Route 3 SW and an easement corridor on either side of the highway. After the landfill slide in 1997, WSDOT installed two riprap berms with corrugated metal pipes for drainage in the easement corridor between the landfill and the State Route, as illustrated on Figure 3. The berms were engineered to temporarily retain water and trap debris in the event of minor landfill slides.

3.2 Site History

The landfill in the Gorst Creek ravine was active from 1968 until the late 1980s. Based on historical research for the subject property, it appears that the landfill had three distinct generations of operation and ownership. The auto wrecking yard operation was started by three Bremerton-area businessmen in 1964 as Ames Auto Wrecking, Inc. The landfill operation, under the same name, began in April 1968 when the property owners began accepting public waste for disposal in the Gorst Creek ravine. Soon after, Ames Auto Wrecking, Inc. successfully underbid a competing disposal site for the Puget Sound Naval Shipyard (PSNS) refuse disposal contract for the period of July 1, 1969, through June 30, 1970. After the one-year PSNS contract expired, the Ames landfill continued to accept waste from public dumping and occasional demolition debris contracts.

The second generation of landfill operations began in 1973, when a new owner took over and renamed the site Bremerton Auto Wrecking, Inc. The second owner continued the public and demolition debris landfill operation until 1980, when he sold the property and operations to Mr. Sid Uhinck of Bremerton, Washington. After 1980, the landfill was permitted only for demolition debris, but continued to accept public waste. Mr. Uhinck passed away in 1985 and left the property and operations to his widow, the current property owner, Mrs. Lucille Uhinck. The landfill ceased operations in the late 1980s. In 1989, a "Declaration of Property Line Adjustment" was filed in Kitsap County to separate the land containing the landfill property from the adjacent auto wrecking yard (See Figure 2). In 1993, Lucille Uhinck sold the auto wrecking yard property, excluding the landfill portion, to Jerry Cross. Mr. Cross currently operates Airport Auto Wrecking, Too adjacent to the east side of the landfill.

4.0 INVESTIGATION OBSERVATIONS AND FINDINGS

4.1 Physical Investigations

4.1.1 Boundary and Elevations Survey

Under subcontract to Hart Crowser, Bush, Roed, and Hitching, Inc., conducted landfill property boundary and elevation surveys during September 1999. The boundary survey was based on Kitsap County Records and the Title Report for the property included as Appendix A of this report. The survey provided set boundary corners and identified easements, covenants, and restrictions, as presented in the Title Report. Based on a review of the boundaries of the landfill property, it appears that landfill debris and cover likely encroach on adjacent properties on all sides. Boundary survey data were recorded in a GIS-compatible electronic file. The file was modified for use in this report, as presented on Figure 2.

The elevation survey was conducted by recording spot elevations, where possible, along the perimeter of the site on or near property lines and along the top of the creek embankment. The Kitsap County vertical datum was used and on-site benchmarks were set. Spot elevation survey data were recorded in a GIS-compatible electronic file. The file was modified and contours were estimated for this report, as presented on Figure 3.

4.1.2 Limited Soil and Slope Stability Assessment

Hart Crowser conducted a limited soil and slope stability assessment of the landfill site and Gorst Creek ravine on September 16, 1999. Based on a reconnaissance of the landfill mass by geotechnical engineers, the following site conditions were noted.

There is evidence of debris flows and surface erosion near the northwest limits of the landfill waste. In this area, the underlying native soil material contains over-steepened slopes that are particularly susceptible to surface erosion and "blow-outs." The natural slopes along the sides of the ravine are estimated to be about 36° to 40° from horizontal. In general, the native ravine slopes appear to contain no evidence of deep-seated sliding or slumps.

Based on this reconnaissance, debris flows are primarily attributed to surface water erosion and groundwater seepage. At the time of the reconnaissance, the site was dry. However, there has been significant flow in the past, as evidenced by channel erosion, sediment deposition, site photographs, and historical information about the site. Finally, if the buried culvert pipe running beneath the landfill mass is broken or truncated, this would further contribute to the instability of the landfill.

It appears that the over-steepened native slopes become less stable where they are exposed to surface water erosion. It also appears that a significant volume of surface water has infiltrated through the waste and traveled along the older native soil contact, following the buried channel. This water eventually reaches the exposed slopes in Gorst Creek ravine and aggravates the erosion of the over-steepened slopes. Unless the drainage behind the slope is improved, we expect continued slope movement and erosion of surficial materials during the wet seasons.

4.1.3 Area Hydrogeology Assessment

The surface geology of the area is glacially overridden, very dense, silty to very silty, gravelly sand (Vashon Till). The Vashon Till overlies most of the Sunnyslope Upland area, to a thickness of up to 50 feet. Beneath the till lie the water-bearing Vashon Advance Outwash sand and gravel deposits, ranging from 10 to 50 feet in thickness. In the vicinity of the creek drainages, including Gorst and Parish Creeks, the till is eroded to expose the Advance Outwash deposits (AGI, 1996).

An older till layer, ranging from 0 to 40 feet in thickness, is present in some areas beneath the Vashon Advance Outwash deposits. This older till layer is absent in places, allowing hydraulic connection between the Vashon Advance Outwash deposits and an older sand and gravel layer beneath, which can be 50 feet thick or more. The water-bearing sand and gravel units, including the Vashon Advance Outwash deposits and the older sand and gravel units, are called the Upland Aquifer (AGI, 1996).

Groundwater flow in this area of the Upland Aquifer is toward the northwest, where it merges with the Twin Lakes Aquifer within the Gorst Valley (AGI, 1996).

4.1.4 Site Surface Water and Groundwater Conditions

The site is located on the Sunnyslope Upland, in the Gorst Creek basin, with elevations ranging from approximately 350 to 420 feet above sea level. The landfill is situated in an approximately 700-foot-long reach of the Gorst Creek ravine. Gorst Creek flows seasonally beneath the landfill mass through a concrete pipe along the contact with the old channel bottom. The culvert is likely damaged or destroyed somewhere beneath the landfill. The Creek emerges again approximately 50 feet north of the toe of the landfill. Gorst

Creek flows at the surface for 200 to 300 feet before entering a 4-foot square box culvert that channels water under State Route 3 SW.

During periods of heavy rain, surface water accumulates in the ravine in quantities that cannot be adequately drained by the concrete pipe underlying the landfill. In these instances, surface water backs up behind the landfill. Site observations indicate that backed up surface water makes its way along the buried channel bottom, through the fill material, and/or overflows over the top of the landfill to emerge into the creek channel below the landfill.

In the vicinity of the site, the groundwater in the Upland Aquifer likely flows toward the Gorst Valley. The steep Gorst Creek ravine appears to cut into the Upland Aquifer, thereby gaining water from groundwater seepage from the slope faces. Since Gorst Creek appears to be a gaining stream through this steeply sloped area, it seems probable that little of the precipitation or surface water moving through the fill would move into the groundwater system at this location. Rather, the majority of this water likely moves off site with surface water flow in the Gorst Creek channel.

4.2 Environmental Investigations

Environmental sampling was conducted in accordance with methods provided with this report in Appendix B. Field observations and measurements recorded during sampling are provided in Table B of that appendix. Sample types and locations referenced in this report are illustrated on Figure 4. Analytical results are provided in Tables 1 through 6. Finally, data validation reports and certificates of analysis are provided in Appendix C.

4.2.1 Surface Soil Quality Observations and Findings

Surface Soil Sampling. Discrete surface soil samples were collected from surrounding ravine walls, with one upgradient background sample (GL-SS-01) and three samples (GL-SS-02, GL-SS-03, and GL-SS-04) collected immediately downgradient of the landfill. In addition, three composite surface soil samples were collected from exposed areas of the north face of the landfill. The composite samples were collected from three defined horizontal zones, the bottom (GL-SS-05), middle (GL-SS-06), and the top (GL-SS-07). A field duplicate surface soil sample, GL-SS-08, was collected with GL-SS-07. Field parameters recorded during surface soil sampling are provided in Table B-1. These parameters include sample ID, sample date, sample type, air monitoring data, sample depth, and soil types.

Each of the four ravine wall soil samples was collected from 0 to 0.5 foot below grade. In general, surface soils from ravine walls were characterized as moist, brown, slightly silty, gravelly sand with organics. No odors or visible indications of contamination, such as staining or stressed vegetation, were noted during sampling. Random debris from the landfill was noted along ravine walls both upgradient and downgradient of the landfill mass. Air monitoring data collected using a photoionization detector (PID) did not indicate the presence of volatile compounds in soils.

Each of the three landfill surface soil samples consisted of a four-point composite collected from 0 to 0.5 foot below grade. The surface soil samples collected directly from the north face of the landfill were characterized as moist, very gravelly, fine to medium sand with debris. The samples were collected from areas of the slope intermittent with exposed debris and soil cover. Air monitoring data collected using a PID did not indicate the presence of volatile compounds in soils.

Surface Soil Analytical Results. The following analyses were conducted for discrete and composite surface soil samples collected from the Gorst Landfill site.

- Total Petroleum Hydrocarbons as Gasoline (NW-TPHG);
- Total Petroleum Hydrocarbons as Diesel (NW-TPHD);
- Polychlorinated biphenyls (PCBs) and OC Pesticides (EPA Method 8081/8082);
- Priority Pollutant Metals (EPA Method 6010/7000 Series);
- Leachable Priority Pollutant Metals by TCLP (EPA Method 1311/6010/7000 Series);
- Volatile Organic Compounds (VOCs, CLP OLM01.8); and
- Semivolatile Organic Compounds (SVOCs, CLP OLM01.8).

Analytical results were compared against the MTCA Residential Cleanup Levels (Methods A and B) for Soil.

Analytical results for surface soils are provided in Table 1 and are summarized as follows:

- For Total Petroleum Hydrocarbon (TPH) analysis, gasoline-range hydrocarbons were not detected at laboratory detection limits for any of the surface soil samples. Diesel- and motor oil-range hydrocarbons were detected at concentrations below MTCA Method A Soil Cleanup Levels for samples from ravine walls, but were not detected at laboratory detection limits for samples from the landfill face.

- For PCBs, analytical results reveal concentrations below the MTCA Method A residential criteria of 1.0 mg/kg for total PCBs. The MTCA Method B criterion for total aroclors was exceeded for three surface soil samples, GL-SS-03, GL-SS-04, and GL-SS-05. MTCA Method B criterion were not applied for this comparison based on the fact that none of the individual Method B Aroclor criteria were exceeded, and because the Method B criterion are based on a mixture of aroclors. Not all aroclors considered in that mixture calculation were detected in surface soil samples for this project.

  OC pesticides were either not detected at analytical laboratory detection limits or were detected at concentrations well below MTCA Method B criteria for the surface soil analyzed.

- With the exception of arsenic, Priority Pollutant Metals were not detected at analytical laboratory detection limits, or were present at concentrations well below Method A and B Residential Cleanup Levels. Arsenic was detected in concentrations above MTCA Method B cleanup levels in three surface soil samples, GL-SS-01, GL-SS-02, and GL-SS-03. These detected arsenic concentrations, however, are below the regional background concentration of 7 mg/kg for the Puget Sound (Ecology, 1994) and below the MTCA Method A residential soil cleanup level of 20 mg/kg;

- Leachable metals (TCLP) were not detected at analytical laboratory detection limits, or were well below Ecology criteria for hazardous waste designation provided in WAC 173-303. Although leachable metals concentrations (highly conservative by TCLP) were above some surface water quality criteria, the surface water quality data (discussed below) empirically demonstrate no metals impacts to Gorst Creek;

- VOCs were not detected at analytical laboratory detection limits for any of the surface soil samples; and

- Based on analysis of surface soils for SVOCs, low concentrations of cPAHs were detected in two samples above MTCA Method B criteria. Total cPAH concentrations, however, are below MTCA Method A residential criteria of 1.0 mg/kg.

4.2.2 Freshwater Sediment Quality Observations and Findings

Freshwater Sediment Sampling. For freshwater sediment characterization, one sample (GL-SED-01) was collected upgradient and three samples (GL-SED-02, GL-SED-03, and GL-SED-04) were collected downgradient of the landfill mass. As described in Appendix B, sediment samples were collected from areas of active deposition. The sediment samples consisted of a five-point composite, with a center point and four radial points at 1-foot intervals from the center point. Field parameters recorded during freshwater sediment sampling are provided in Table B-2. These parameters include sample ID, sample date, air monitoring data, sample depth, and sediment types.

Each of the four freshwater sediment samples was collected from 0 to 0.2 foot below sediment grade. In general, sediments were sandy with some silt and gravel. No odors or visible indications of contamination were noted during sampling. Air monitoring data collected using a PID did not indicate the presence of volatile compounds in sediments.

Freshwater Sediment Analytical Results. The following analyses were conducted for freshwater sediment samples collected from the Gorst Landfill site.

- Total Petroleum Hydrocarbons as Gasoline (NW-TPHG);
- Total Petroleum Hydrocarbons as Diesel (NW-TPHD);
- PCBs and OC Pesticides (EPA Method 8081/8082);
- Priority Pollutant Metals (EPA Method 6010/7000 Series);
- Leachable Priority Pollutant Metals by TCLP (EPA Method 1311/6010/7000 Series);
- Volatile Organic Compounds (VOCs, CLP OLM01.8);
- Semivolatile Organic Compounds (SVOCs, CLP OLM01.8); and
- Total Organic Carbon (TOC).

Analytical results were compared to risk-based criteria, including Ecology Freshwater Sediment Quality Values (FSQVs) (Ecology, 1997) and EPA EcoTox Thresholds (EPA, 1996). For many analytes, no criteria are available for evaluation of freshwater sediment quality. Analytical results for freshwater sediments are provided in Tables 2 and 5. The results are summarized as follows:

- EPA and Ecology freshwater sediment criteria are not available for petroleum hydrocarbons. None of the four sediment samples analyzed contained detectable concentrations of gasoline-range hydrocarbons based on analytical laboratory detection limits. In addition, diesel- and motor oil-range hydrocarbons were not detected at laboratory detection limits for sediment samples, with the exception of GL-SED-02. Sample GL-SED-02 contained 44 milligrams/kilogram (mg/kg) diesel-range hydrocarbons and 400 mg/kg heavy oil-range hydrocarbons. However, review of the chromotogram for this result indicates the TPH is present in GL-SED-02 as heavy oil only.

- For PCB and OC pesticide analyses, Ecology FSQV criteria are available for Aroclor 1248, Aroclor 1254, and Total PCBs. The EPA EcoTox criteria include a value for 4,4'-DDT. However, this value is actually derived from the NOAA Effects Range Low (ERL) criteria (Long et al., 1995). No additional Ecology or EPA freshwater criteria were available.

  For samples GL-SED-01, GL-SED-03, and GL-SED-04, analytes were not detected at analytical laboratory detection limits. The detection limits were above the screening criteria for the four compounds listed above. It should be noted that the reported detection limits for these compounds were at or below the Practical Quantitation Limit (PQL) (Ecology, 1993), indicating that the detection limits are the quantitative limits of the analytical method used.

  For sample GL-SED-02, 4,4'-DDT was detected at an estimated concentration of 0.012 mg/kg, above the EcoTox Threshold of 0.0016 mg/kg. The elevated 4,4'-DDT concentration at this location is likely related to the higher silt content and organic carbon present in this sample when compared to the remaining sediment samples. As stated in an EPA ECO update memorandum (EPA, 1996), there is relatively low correlation between incidence of effects and the criteria concentration of DDT. The published EcoTox Threshold should be used cautiously (Long et al., 1995).

- The four sediment samples were analyzed for priority pollutant metals. Ecology FSQV criteria are available for the metal analytes, with the exception of antimony, beryllium, nickel, selenium, and thallium. None of the samples contained concentrations of metals above applicable FSQV criteria, where available.

- Analysis of the four sediment samples for TCLP metals indicated leachable metal concentrations below analytical laboratory detection limits, or at low concentrations just above the detection limits. The leachable lead concentration (highly conservative by TCLP) measured in sample GL-SED-02 was above the surface water quality criteria; however, the surface water quality data (discussed below) empirically demonstrate no metals impacts to Gorst Creek.

- Ecology and EPA criteria are not available for VOCs in freshwater sediments. VOCs were not detected at analytical laboratory detection limits for any of the freshwater sediment samples analyzed.

- For SVOCs, FSQV and EcoTox criteria are available for some analytes. SVOC concentrations were either not detected or were below the available screening criteria. For two analytes (carbazole and Dibenz(a,h)anthracene), the laboratory method detection limit was higher than the screening criteria. Detectable concentrations of SVOCs (estimated concentrations below laboratory reporting limits) were limited to location GL-SED-02.

4.2.3 Groundwater Quality Observations and Findings

Groundwater Sampling. Groundwater was assessed using existing Bremerton Water District (BWD) monitoring well BR-11 located north of the landfill property on the opposite side of State Route 3 SW. Well BR-11 was originally installed in 1992 to provide background data for a biosolids land application project conducted by the City of Bremerton. The well was selected for sampling and analysis for this project based on its downgradient/cross-gradient location relative to the subject property. The location of the well is indicated on Figure 1.

Hart Crowser sampled the well on January 14, 2000, with observation by BWD staff. Sample GL-GW-BR11 was collected, along with a quality control field duplicate sample GL-GW-BR12. Field parameters collected during groundwater sampling are provided in Table B-3. These parameters include sample ID, sample date, depth to groundwater, depth to sediment, purge volume, temperature, and pH.

The groundwater level was 57.57 feet below the top of the well casing at the time of sampling, with depth to sediment at 73.7 feet below the top of the casing. Approximately 8 gallons of water were purged before water parameters stabilized. When sampled, well water was approximately 9 degrees Celsius, with a pH of 7.0. No odors, sheen, or other visible indications of contamination were noted during sampling.

Groundwater Analytical Results. The following analyses were conducted for groundwater samples collected from well BR-11.

- PCBs (EPA Method 8082);
- Total and Dissolved Priority Pollutant Metals (6010/7000 Series);
- Volatile Organic Compounds (VOCs, CLP OLM01.8);
- Semivolatile Organic Compounds (SVOCs, CLP OLM01.8); and
- Total Suspended Solids (TSS, EPA Method 160.2);

Analytical results were compared against MTCA Method A and Method B groundwater cleanup levels, where available. Analytical results for groundwater are provided in Tables 3 and 5. The results are summarized as follows:

- Groundwater sample results were below analytical laboratory detection limits for total PCBs. MTCA Method B groundwater criteria for PCBs are below laboratory detection limits. It should be noted that the reported detection limits for these compounds were at or below the Ecology PQL (Ecology, 1993), indicating that the detection limits are the quantitative limits of the analytical method used.

- Groundwater sample results for priority pollutant metals were below analytical laboratory detection limits. The MTCA Method B groundwater criteria for antimony, arsenic, beryllium, and thallium are below laboratory detection limits. With the exception of antimony and beryllium, the detection limits met the reporting limit goals as specified in the project QAPP (Hart Crowser, 1999).

- VOCs were not detected at analytical laboratory detection limits for groundwater samples. Since CLP methodologies were used for this analysis, several compound detection limits were above available groundwater criteria. However, the detection limits met the reporting limit goals as specified in the project QAPP (Hart Crowser, 1999).

- SVOCs were not detected at analytical laboratory detection limits for groundwater samples. Since CLP methodologies were used for this analysis, several compound detection limits were above available groundwater criteria. However, the detection limits met the reporting limit goals as specified in the project QAPP (Hart Crowser, 1999).

4.2.4 Surface Water Quality Observations and Findings

For the Gorst Creek surface water quality characterization, one sample (GL-SW-01) was collected upgradient of the landfill mass and one sample (GL-SW-02) was collected downgradient of the landfill mass. As described in Appendix B, each surface water sample was collocated with a freshwater sediment sample from an area of active sediment deposition (GL-SW-01 collocated with GL-SED-01; GL-SW-02 collocated with GL-SED-03). Surface water samples were collected prior to freshwater sediment sampling in each case to minimize turbidity in the surface water sample and to avoid disturbing sediments to be sampled. Field parameters recorded during surface water sampling are provided in Table B-4. These parameters include sample ID, sample date, sample depth, temperature, pH, dissolved oxygen, and conductivity.

Water samples were collected from approximately 0.3 foot below water surface for GL-SW-01, and from 0.6 foot below water surface in GL-SW-02. No odors, sheens, or other visible indications of contamination were noted during sampling.

Surface Water Analytical Results. The following analyses were conducted for surface water samples collected from Gorst Creek.

- PCBs (EPA Method 8082);
- Total and Dissolved Priority Pollutant Metals (6010/7000 Series);
- Volatile Organic Compounds (VOCs, CLP OLM01.8);
- Semivolatile Organic Compounds (SVOCs, CLP OLM01.8);
- Total Suspended Solids (TSS, EPA Method 160.2);
- Hardness (EPA Method 6010);
- Cations (Ca, Fe, Mg, Mn, K, and Na, EPA Method 6010); and
- Anions (Cl, NO_3, SO_4, carbonate alkalinity, bicarbonate alkalinity, EPA Method 300.0).

Analytical results were compared against MTCA Method B Surface Water criteria and/or Water Quality Standards for Surface Waters of the State of Washington (Chapter 173-201A WAC). For many analytes, no criteria are available for evaluation of surface water quality. Analytical results for surface water are provided in Tables 4, 5, and 6. The results are summarized as follows:

- Both surface water sample results were below analytical laboratory detection limits for total PCBs. Available surface water criteria for PCBs are below laboratory detection limits. It should be noted that the reported detection limits for these compounds were at or below the PQL (Ecology, 1993), indicating that the detection limits are the quantitative limits of the analytical method used.

- Surface water sample results for priority pollutant metals were at or below analytical laboratory detection limits. Detection limits for several metals were above at least one of the surface water criteria.

- Total mercury was detected at the laboratory detection limit of 0.2 ug/L in the upgradient sample (SW-01). The state Water Quality Standards only provide criteria for total recoverable mercury at 0.012 ug/L. With available data, it is not possible to determine how much of the total mercury detected in SW-01 is present as dissolved mercury, and how much is attributable to turbidity in the sample. It is noteworthy, however, that dissolved mercury was not detected at laboratory detection limits in the upgradient or downgradient samples. Note that Ecology (1993) specifies the PQL for mercury in water as 0.2 ug/L and the method detection limit (MDL) as 0.2 ug/L. The analytical method used for this project complies with the requirements of WAC 173-340-830 (Analytical Procedures). In cases where the cleanup criterion is below the PQL, the PQL represents the cleanup standard under MTCA (WAC 173-340-707).

Regardless, based on the detection of total mercury in the upgradient sample and no detection in the downgradient sample, mercury is present in higher concentrations in surface water upgradient of the landfill than downgradient of the landfill. The landfill, therefore, does not appear to be contributing mercury to the creek water.

- VOCs were not detected at analytical laboratory detection limits for either surface water sample. Since CLP methodologies were used for this analysis, several compound detection limits were above available criteria. However, the detection limits met the reporting limit goals as specified in the project QAPP (Hart Crowser, 1999).

- SVOCs were not detected at analytical laboratory detection limits for either surface water sample. Since CLP methodologies were used for this analysis, several compound detection limits were above available criteria. However, the detection limits met the reporting limit goals as specified in the project QAPP (Hart Crowser, 1999).

- Surface water samples were analyzed for major ion distributions to determine if water flowing in Gorst Creek upgradient of the landfill is geochemically similar to the water emerging from beneath the landfill downgradient of the fill. Differences in the major ions in the samples might indicate contributions to the creek from water percolating through the landfill, infiltration of groundwater into the landfill, or a breach in the culvert carrying water under the landfill.

  The major ion distributions in the two surface water samples were analyzed using Piper and Stiff diagrams. Figure 5 provides a geochemical comparison of surface water samples using a Piper diagram. Figure 6 provides a geochemical comparison of surface water samples using a Stiff diagram. Water samples are considered similar if ion concentrations plot on the diagrams in generally the same locations. Analysis of the diagrams indicate that the ion distributions of the two surface water samples are very similar, with the exception of higher levels of calcium in GL-SW-02 as compared to

GL-SW-01. An increase in calcium as surface water passes through the landfill may be attributed to calcium leaching from the concrete culvert pipe, or may indicate a breach in the culvert, with the added calcium coming from concrete demolition debris present in the landfill. In general, there is no major difference between creek water quality upstream and downstream of the landfill.

- The pH of Gorst Creek surface water upgradient and downgradient of the landfill mass was above the 8.5 limit provided in Water Quality Standards for Surface Waters of the State of Washington (Chapter 173-201A WAC). At the time of sampling, the pH at GL-SW-01 was 9.9; at GL-SW-02 the pH was 9.0.

  To verify that the elevated pH measurements obtained at the time of sampling were not the result of instrument error, Hart Crowser revisited the Gorst Creek ravine on June 9, 2000, to obtain additional pH readings. The readings were collected in the vicinity of the previous sample locations for SW-01 and SW-02. During this measurement event, two pH meters were used to confirm the results. In addition, the pH meters were calibrated in a buffered solution before and immediately following the measurements.

  Once on site, the Hart Crowser field representative noted that Gorst Creek was dry at the former site of sample SW-01, upgradient of the landfill. There was no flow going into the atrium drain that diverts water from Gorst Creek under the landfill. The field representative walked approximately 100 feet upstream of the atrium drain in the creek bed until he encountered a flow estimated at 10 gallons per minute (gpm) in the creek bed. He collected two pH measurements at this location.

  Stream conditions downgradient of the landfill showed an estimated flow of approximately 4 gpm coming out of the corrugated pipe at the base of the landfill. The field representative collected two pH measurements at this location.

  The pH measurements obtained on June 9, 2000, indicated a pH of 8.4 in upgradient surface water and a pH of 7.0 in downgradient surface water. The June data suggest that the initial (January) readings were erroneously high (alkaline); however, potential affects of different flow conditions (seasonality) is not known. The June readings are more in the "typical" range for regional streams. The readings confirm a decrease in pH from upgradient to downgradient. The downgradient reading is near neutral and within the acceptable range for class AA (extraordinary) waters (6.5 to 8.5) under WAC 173-201A. The upgradient reading is at the upper end of this range.

Therefore, the data indicate no adverse impacts to downstream water quality associated with the landfill.

4.3 Screening Level Assessment of Risk to Fish

Hart Crowser conducted a screening level assessment of sediment and surface water quality immediately upgradient and downgradient of the Gorst Landfill. The purpose of the limited assessment was to determine whether constituents from the landfill present a risk to the Suquamish Salmon Rearing Facility and Restoration Area (fish hatchery) located approximately 2.5 to 3 miles downstream of the landfill (Figure 1). The exposure pathway from the landfill to the fish hatchery is assumed to be limited to the leaching of constituents from the landfill mass and migration to the fish hatchery via surface water and/or sediment transport. Assuming this exposure pathway, the assessment was limited to an evaluation of sediment and surface water quality.

To evaluate potential risks from chemical contaminants, the sediment and surface water data were compared to risk-based screening levels to determine if constituents detected were present at levels of concern for ecological receptors. The sediment and surface water screening levels that were used in this assessment are presented below.

Sediment Screening Levels:

- Washington State Freshwater Sediment Quality Values (FSQV) (Ecology, 1997); and
- EcoTox Thresholds (EPA, 1996) including Sediment Quality Criteria, Sediment Quality Benchmarks, and NOAA's Sediment Guidelines (ERL).

Surface Water Screening Levels:

- Chronic Freshwater Ambient Water Quality Criteria, (EPA, 1999); and
- EcoTox Thresholds, Freshwater Tier II Criteria (EPA, 1996).

The analytical results and risk-based screening of sediment and surface water data are presented in Tables 2 and 4, respectively. As shown in the tables, the only compound that was detected in sediments at concentrations exceeding its respective screening criterion was 4,4'-DDT. 4,4'-DT was detected at an estimated concentration of 0.012 mg/kg in sample GL-SED-02, but was not detected in samples GL-SED-03 or GL-SED-04, both located between GL-SED-02 and the landfill. Therefore, the magnitude of the 4,4'-DDT detection is small (and uncertain given the data qualifier), and the areal extent in sediment is limited.

Surface water samples were collected from the creek channel upgradient (GL-SW-01) and downgradient (GL-SW-02) of the landfill mass. No compounds were detected in either surface water sample, with the exception of total mercury detected at the 0.2 ug/L detection limit in sample GL-SW-01. Dissolved mercury was not detected in either sample. Therefore, the assessment was limited to an evaluation of the detection limits for each compound. As shown in the tables, the detection limits used were acceptable except for total PCBs, five SVOCs, and three metals. None of these compounds were detected in sediment samples above its respective sediment screening criterion. Because these analyses were not detected in freshwater sediment, the potential for them to represent a contaminant of concern is decreased.

Based on the instability of the landfill in its current condition, the potential for debris and surface soils to continue to wash into surface water and destroy downstream gravel beds represent a potential risk to fish spawning habitat in Gorst Creek. In addition, it should be noted that potential future slides from the landfill could release contaminants not detected during this project, which only assessed surface soils.

5.0 CONCLUSIONS

5.1 *Physical Features*

The boundary survey clarified the extent of the landfill property currently owned by Ms. Lucille Uhinck. Based on the property boundary survey and on subsequent site investigations, it appears that landfill debris is not contained by the limits of the property boundary, and likely encroaches on surrounding properties. The elevations survey provided a better understanding of site topography and identified former landfill slide areas.

Based on the limited soil and landfill slope stability assessment, it appears that the over-steepened native slopes become less stable where they are exposed to surface water erosion. It also appears that a significant volume of surface water has infiltrated through the waste and traveled along the older native soil contact, following the buried channel. This water eventually reaches the exposed slopes in Gorst Creek ravine and aggravates the erosion of the over-steepened slopes. In addition, surface water accumulation and migration over the top of the landfill appears likely to occur again during periods of significant precipitation. Unless the drainage behind the slope is improved, continued slope movement and erosion of surficial materials during wet seasons is likely.

Based on a limited review of area hydrogeology, it appears that groundwater flows generally in the direction of the Gorst Valley, toward Sinclair Inlet to the northeast. Similarly, surface water flows through the Gorst Creek ravine through the subject property to the northeast, eventually emptying into Sinclair Inlet. Information reviewed for this report indicates that Gorst Creek is a "gaining" creek on and downgradient of the subject property. This means that groundwater would more likely contribute to surface water flow in Gorst Creek, instead of surface waters moving into and affecting groundwater. Based on this assessment, it appears unlikely that surface water flowing through the landfill would adversely impact groundwater downgradient of the site. In addition, it appears that the BWD monitoring well BR-11 sampled during this project is located in a cross-gradient position relative to the landfill mass. Groundwater in the immediate vicinity of BR-11 is not likely impacted by the landfill.

5.2 Environmental Media

5.2.1 Sampling and Analysis

Based on the sampling and analysis activities conducted for this project, it appears that landfill activities have had a minimal impact on site and area environmental media.

- Surface soils from the ravine walls upgradient and downgradient of the landfill mass, and surface soils from the north face of the landfill, do not contain constituents of concern in excess of regulatory criteria for residential properties. The sampling protocol for this project did not address soils located at depth in the landfill.

- Using Ecology and EPA ecological risk-based criteria for freshwater sediments, it appears that the upgradient sample (GL-SED-01) and two downgradient samples (GL-SED-03 and GL-SED-04) did not exceed available criteria for constituents of concern. One sample, GL-SED-02 contains 4,4'-DDT at a concentration above NOAA Effects Range Low (ERL) criteria for marine and freshwater sediments (Long et al., 1995). It should be noted that a relatively low correlation has been found between incidence of effects and the criteria concentration of DDT. The reference document notes that these criteria should be used cautiously.

- Groundwater was collected from BWD Well BR-11 located north of the landfill, as illustrated on Figure 1. Analytical results did not detect constituents in groundwater based on laboratory detection limits, with the exception of a low-level detection of methylene chloride below MTCA Method B criteria in the field duplicate GL-GW-BR12. Methylene chloride is a common laboratory contaminant (EPA, 1994). Based on the limited hydrogeologic assessment for the area conducted for this project, it does not appear that groundwater in the vicinity of Well BR-11 would be impacted by activities on the landfill property.

- Analytical results for surface water did not reveal exceedences of available criteria.

  The assessment of geochemical characteristics of surface water upgradient and downgradient of the landfill mass shows an increase in calcium as surface water passes through the landfill. The increase in calcium may be attributed to calcium leaching out of the culvert pipe, or may indicate a breach in the culvert pipe with calcium leaching from concrete demolition debris deposited in the landfill.

  Finally, at the time of sampling in January 2000, measured pH in surface water upgradient and downgradient of the landfill was greater than the 8.5 limit provided in Water Quality Standards for Surface Waters of the State of Washington (WAC 173-201A). A subsequent pH measurement event in June 2000 indicated an elevated pH of 8.4 in creek water upgradient of the landfill mass; but a pH of 7.0 was recorded for water discharging directly from the landfill mass. At the time of the June sampling creek water upgradient of the landfill did not flow into the culvert and through the landfill. The cause of the elevated pH in Gorst Creek upgradient of the landfill is undetermined as of this writing. Because the elevated pH was only present upgradient of the landfill mass in the June measurement, it is not likely related to constituents of the landfill.

5.2.2 Screening-Level Assessment of Risk to Fish

Based on the sediment and surface water results, it does not appear that targeted constituents are leaching or being transported from the landfill at concentrations that would be a concern to the fish hatchery located 2.5 to 3 miles downgradient of the landfill. Compounds exceeding the conservative sediment screening criteria were localized to a single downgradient sediment sample. No compounds of concern were detected in the downgradient surface water sample collected. No adverse impacts to the fish hatchery are predicted based on the results of this screening level evaluation.

6.0 RECOMMENDATIONS

Based on the assessment of physical features of the landfill, it appears that the landfill mass and ravine contain over-steepened and unstable slopes. In addition, the culvert designed to drain surface water from the south side of the landfill mass may not be intact, and is insufficient to handle the volume of water reaching the landfill during significant or sustained rain events. Once the culvert reaches capacity, surface water flows through the landfill/native surface contact, percolates through the landfill, or eventually accumulates to the point where it washes over the top of the landfill and down the north face. Based on this information, there is a high potential for slope failure during future rain events. Slope failures may release soils and debris to Gorst Creek, creating the potential for potential site contaminants not detected during this survey to enter the surface water and sediment system.

The Navy has proposed a Focused Remedial Investigation/Feasibility Study to develop an engineered solution to stabilize the landfill mass and contain or cap surface soils. The solution will require a surface water drainage design to divert surface water through, over, or around the capped landfill. The design must have sufficient capacity to handle the volume of storm water characteristic of the region.

Sampling and analysis of environmental media did not reveal a significant impact to the site or surrounding properties from landfill operations. The assessment included exposure routes via surface soils, freshwater sediment, groundwater, and surface water. The limited assessment of potential impacts to a downgradient fish hatchery did not reveal constituents at or concentrations of concern in surface water or freshwater sediment immediately downgradient of the landfill. No actions are needed with respect to protecting downstream receptors, other than the physical stabilization recommendation above.

The proposed remedy of a landfill cap and long-term monitoring will stabilize the landfill and provide for periodic assessment of the effectiveness of the remedy. In addition, recommended institutional controls for the site include secured fencing and landuse restrictions on future residential development and farming. Should land use change in the future, the analytical results provided in this report must be reevaluated in consideration of the new use.

7.0 LIMITATIONS

Work for this project was performed, and this report prepared, in accordance with generally accepted professional practices for the nature and conditions of the work completed in the same or similar localities, at the time the work was performed. It is intended for the exclusive use of EFA, NW for specific application to the referenced property. This report is not meant to represent a legal opinion. No other warranty, express or implied, is made.

Sincerely,

HART CROWSER, INC.

ELISABETH M. BLACK
Project Manager

MATTHEW F. SCHULTZ
Contract Manager

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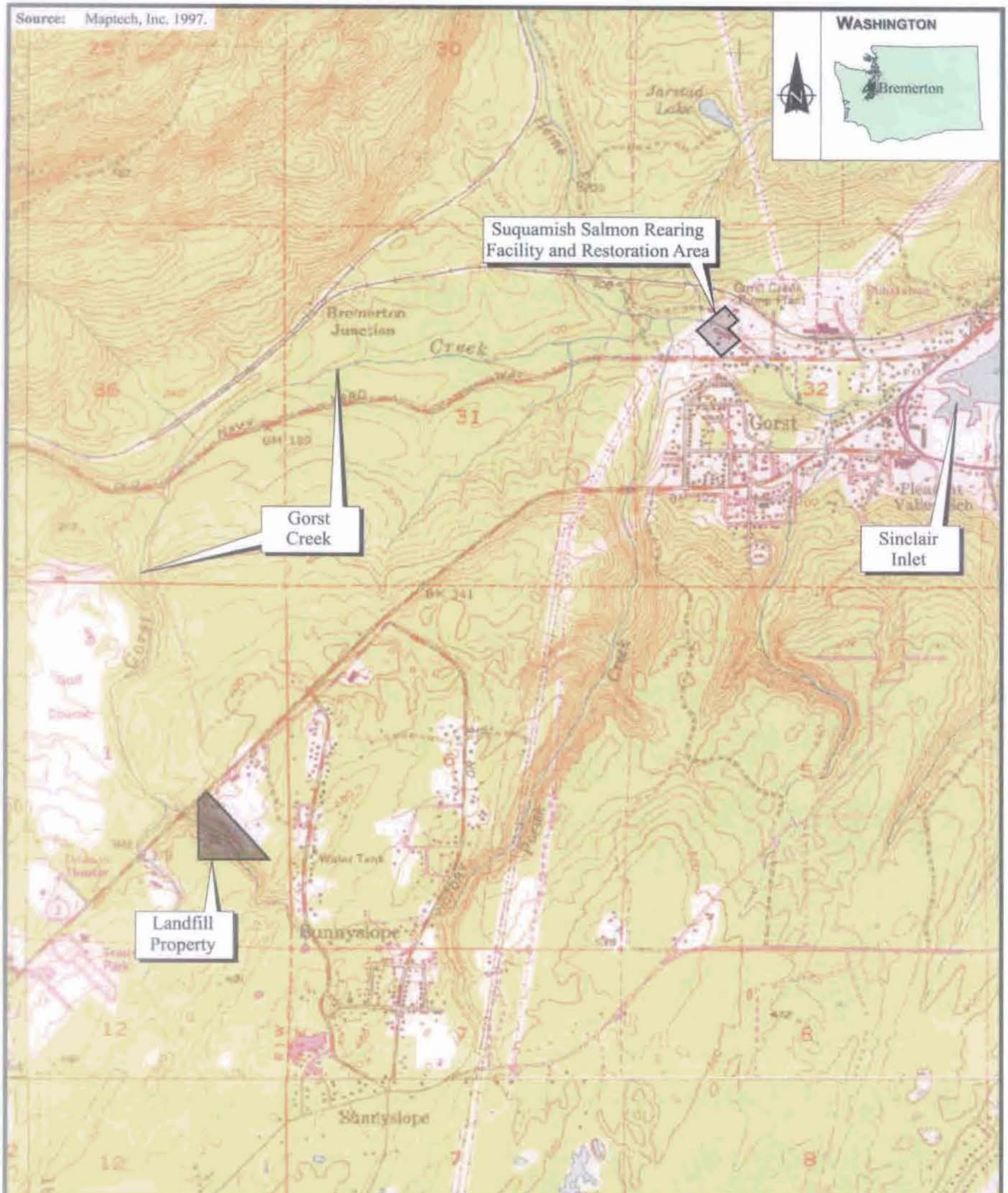
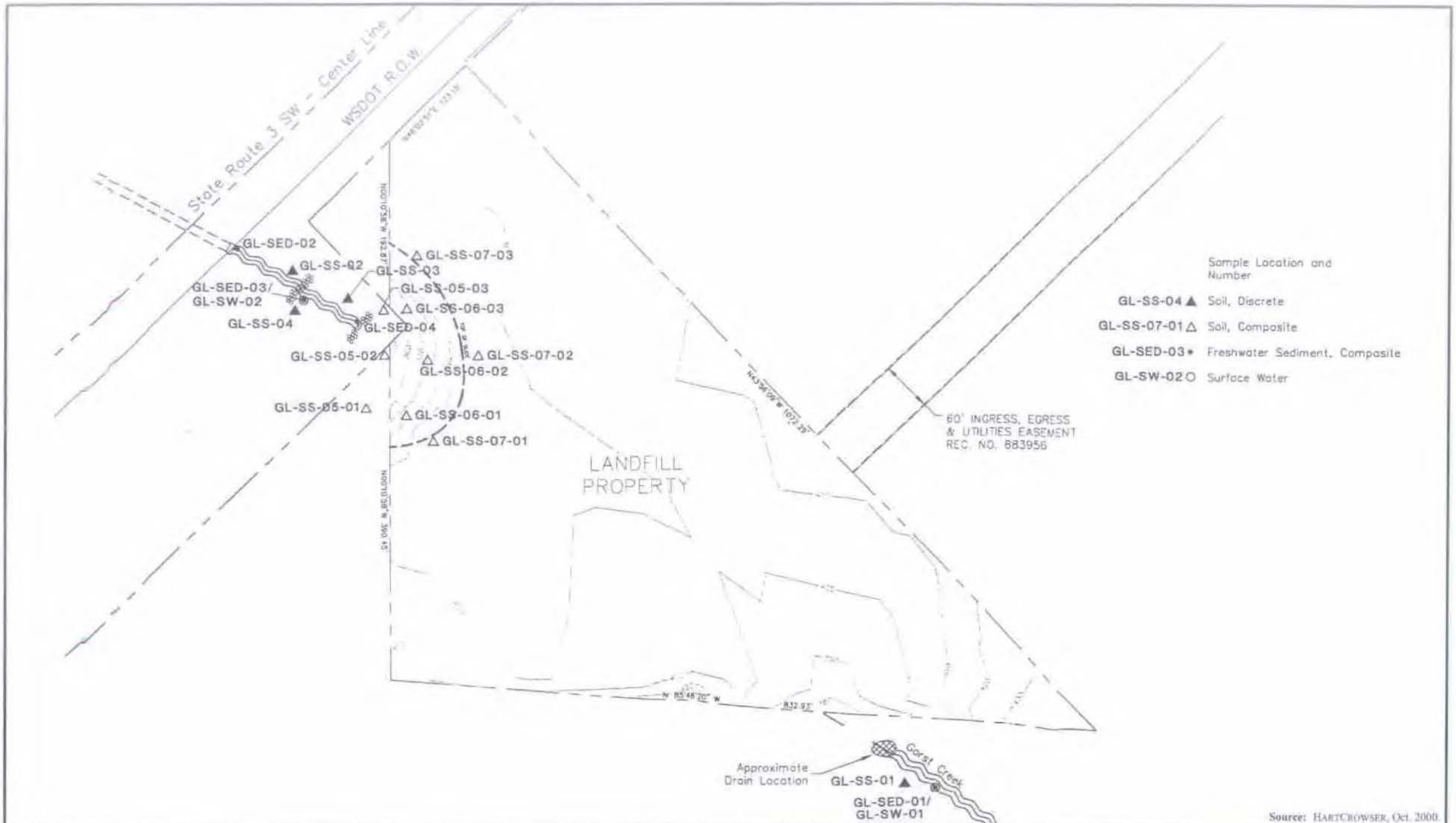


ecology and environment, inc. International Specialists in the Environment Seattle, Washington	GORST CREEK-BREMERTON AUTO WRECKING LANDFILL INTEGRATED ASSESSMENT Port Orchard, Washington	Figure 2-1 SITE VICINITY MAP		
	0 .25 .5 Approximate Scale in Miles	Date: 6-1-04	Drawn by: AES	10:START-2\03070009\S866\fig 2-1

ecology and environment, inc. International Specialists in the Environment Seattle, Washington	N W E S 0 30 60 120 180 240 300 Feet *Map Reference: USGS Digital OrthoPhoto Quarter Quadrangle - Bremerton West, July 7, 1994*	Gorst Creek - Bremerton Auto Wrecking Landfill Integrated Assessment Port Orchard, Washington	Figure 2-2 SITE LAYOUT MAP Date: 02/12/2004 · Drawn by: avh · Job Number: 001281.0291.01IA



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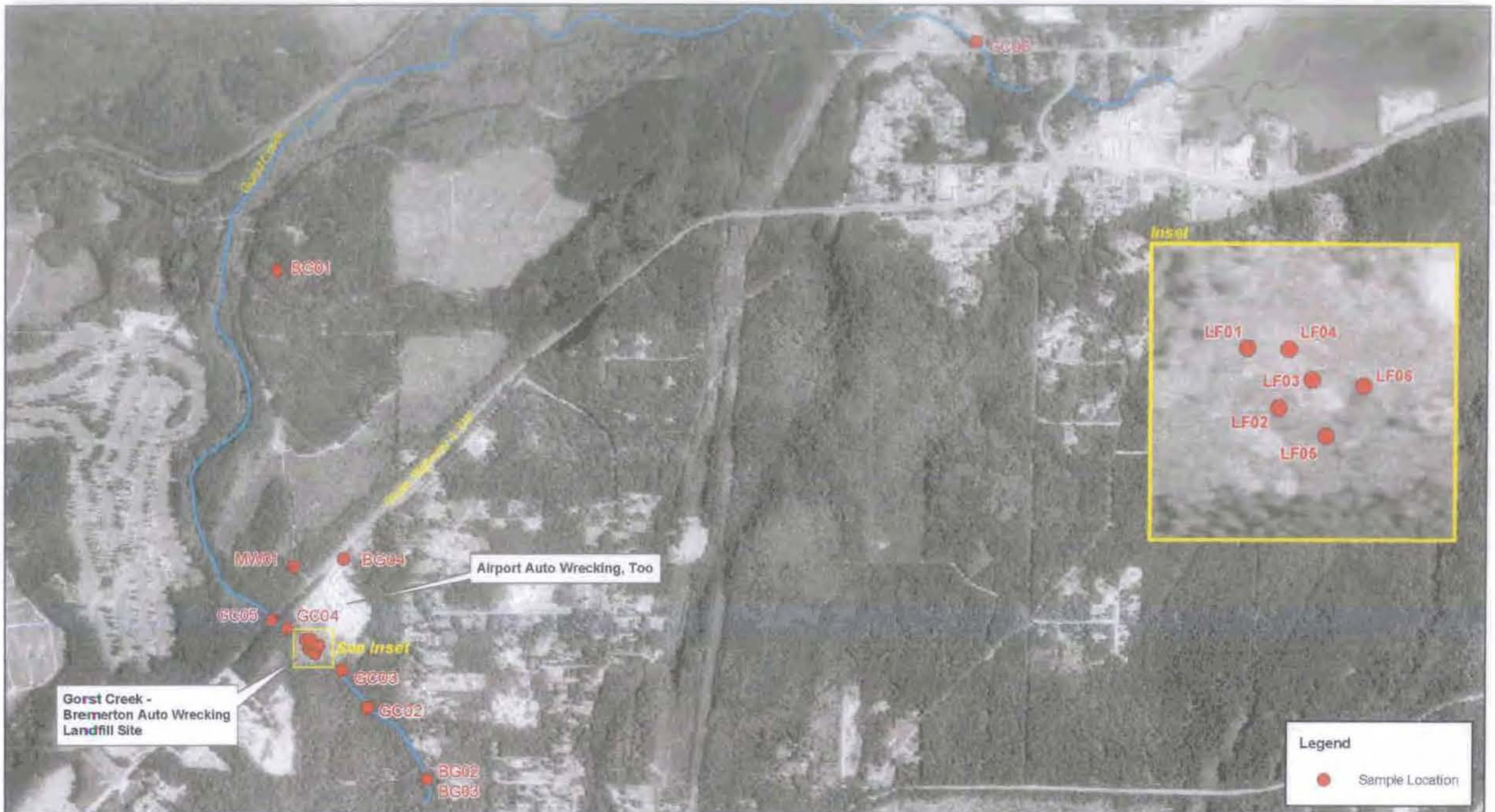
Seattle, Washington

0 100 200
Approximate Scale in Feet

GORST CREEK-BREMERTON
AUTO WRECKING LANDFILL
INTEGRATED ASSESSMENT
Port Orchard, Washington

Figure 2-3
2000 SAMPLE LOCATION MAP

Date: 6/1/04	Drawn by: AES	10:START-2\03070009\S866\fig 2-3



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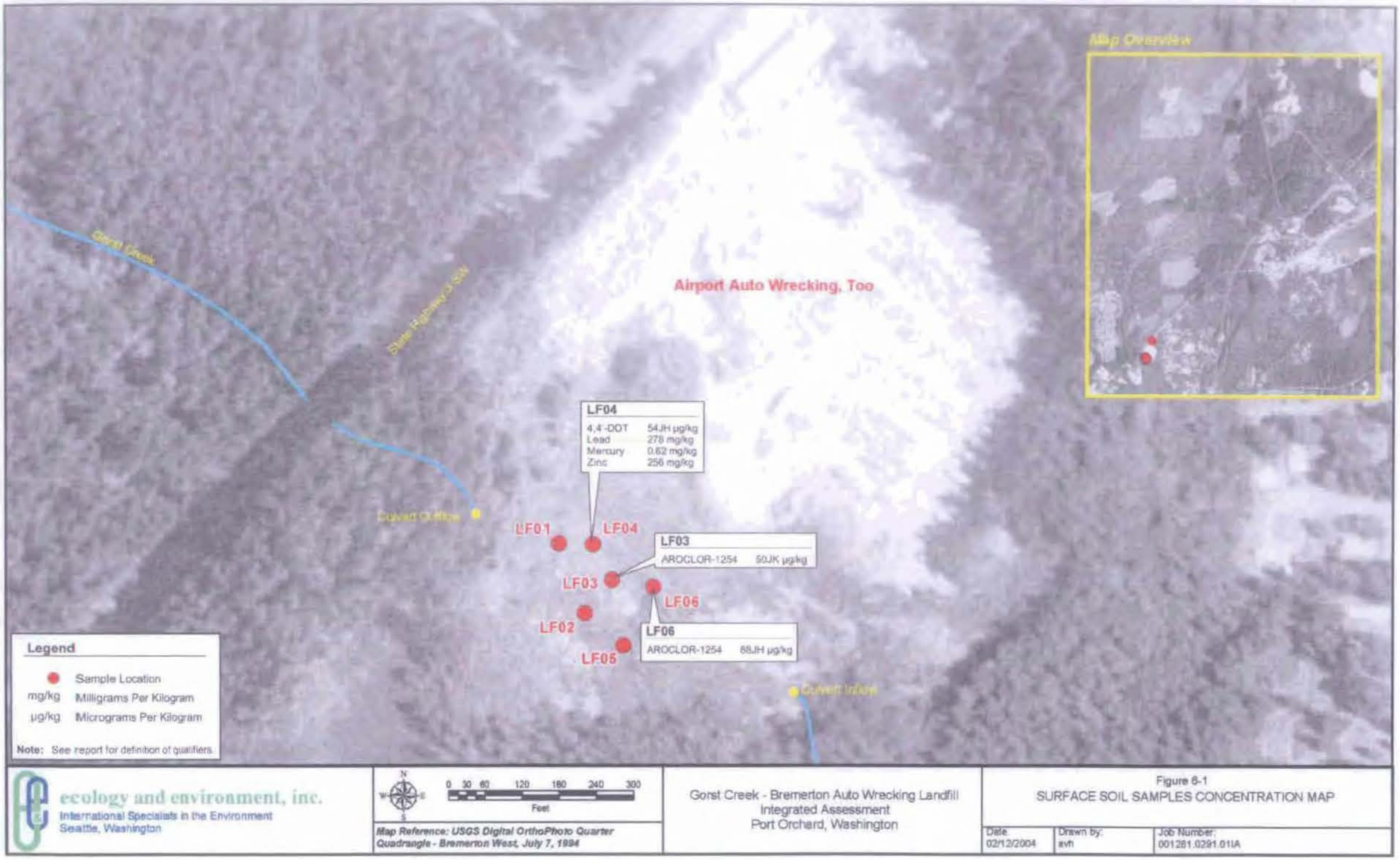
N W E S
0 250 500 1,000 1,500 2,000 2,500
Feet

Map Reference: USGS Digital OrthoPhoto Quarter Quadrangle - Bremerton West, July 7, 1994

Gorst Creek - Bremerton Auto Wrecking Landfill
Integrated Assessment
Port Orchard, Washington

Figure 3-1
SAMPLE LOCATION MAP

Date:	Drawn by:	Job Number:
02/12/2004	avh	001281.0291.01IA


Map Overview
Gorst Creek
State Highway 3 SW
Airport Auto Wrecking, Too
Culvert Outflow
Culvert Inflow
LF01
LF02
LF03
LF04
LF05
LF06
LF04
4,4'-DDT 54JH µg/kg
Lead 278 mg/kg
Mercury 0.62 mg/kg
Zinc 256 mg/kg
LF03
AROCLOR-1254 50JK µg/kg
LF06
AROCLOR-1254 88JH µg/kg
Legend
Sample Location
mg/kg Milligrams Per Kilogram
µg/kg Micrograms Per Kilogram
Note: See report for definition of qualifiers.
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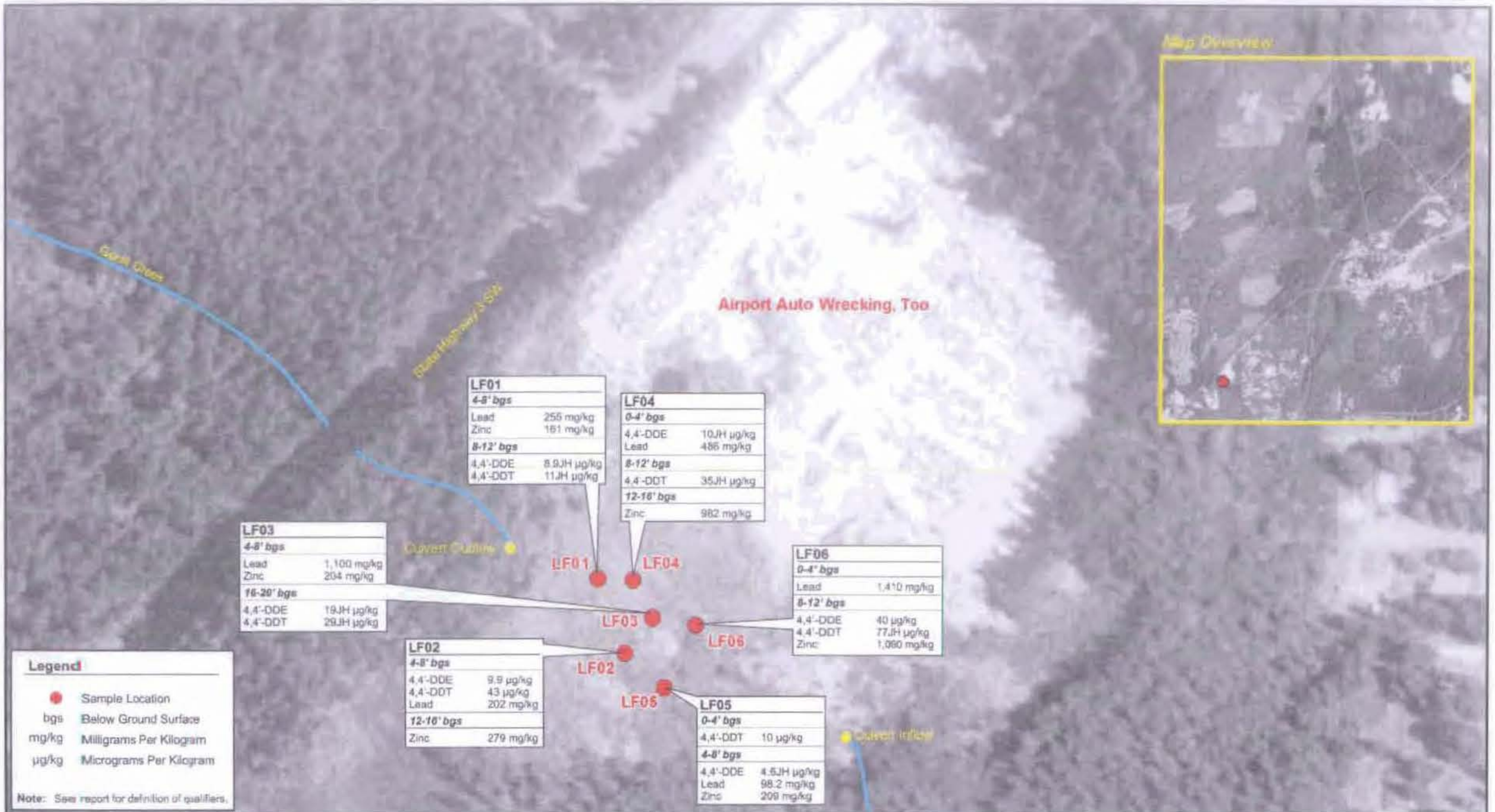
N W E S
0 30 60 120 180 240 300
Feet
Map Reference: USGS Digital OrthoPhoto Quarter Quadrangle - Bremerton West, July 7, 1994
Gorst Creek - Bremerton Auto Wrecking Landfill
Integrated Assessment
Port Orchard, Washington
Figure 6-1
SURFACE SOIL SAMPLES CONCENTRATION MAP
Date: 02/12/2004
Drawn by: avh
Job Number: 001281.0291.01IA



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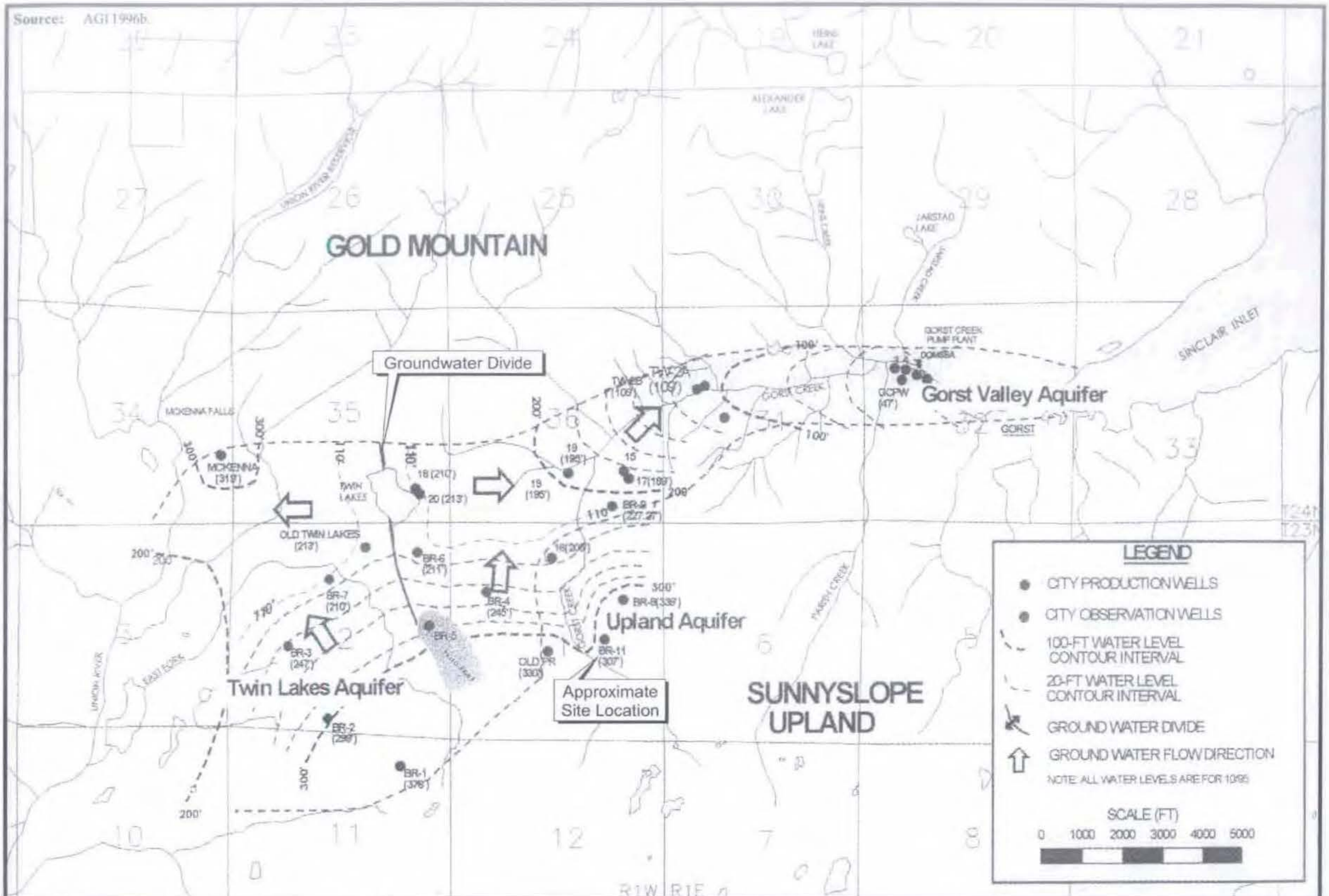
0 30 60 120 180 240 300 Feet

Map Reference: USGS Digital OrthoPhoto Quarter Quadrangle - Bremerton West, July 7, 1994

Gorst Creek - Bremerton Auto Wrecking Landfill
Integrated Assessment
Port Orchard, Washington

Figure 6-2
SUBSURFACE SOIL SAMPLES CONCENTRATION MAP

Date:	Drawn by:	Job Number:
02/12/2004	avh	001281.0291.01IA



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GORST CREEK-BREMERTON
AUTO WRECKING LANDFILL
INTEGRATED ASSESSMENT
Port Orchard, Washington

Figure 7-2
GORST BASIN GROUNDWATER FLOW MAP

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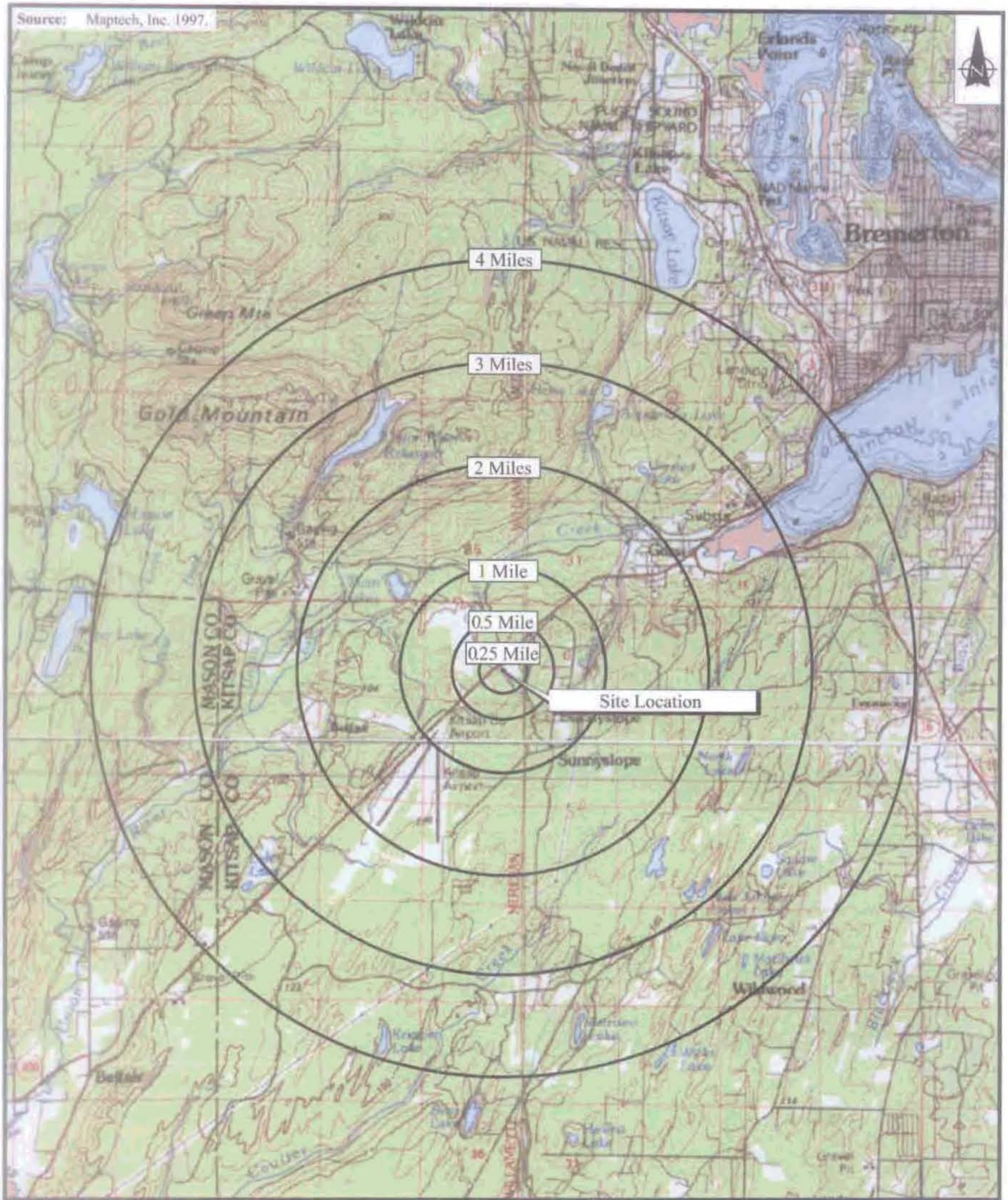

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GORST CREEK-BREMERTON
AUTO WRECKING LANDFILL
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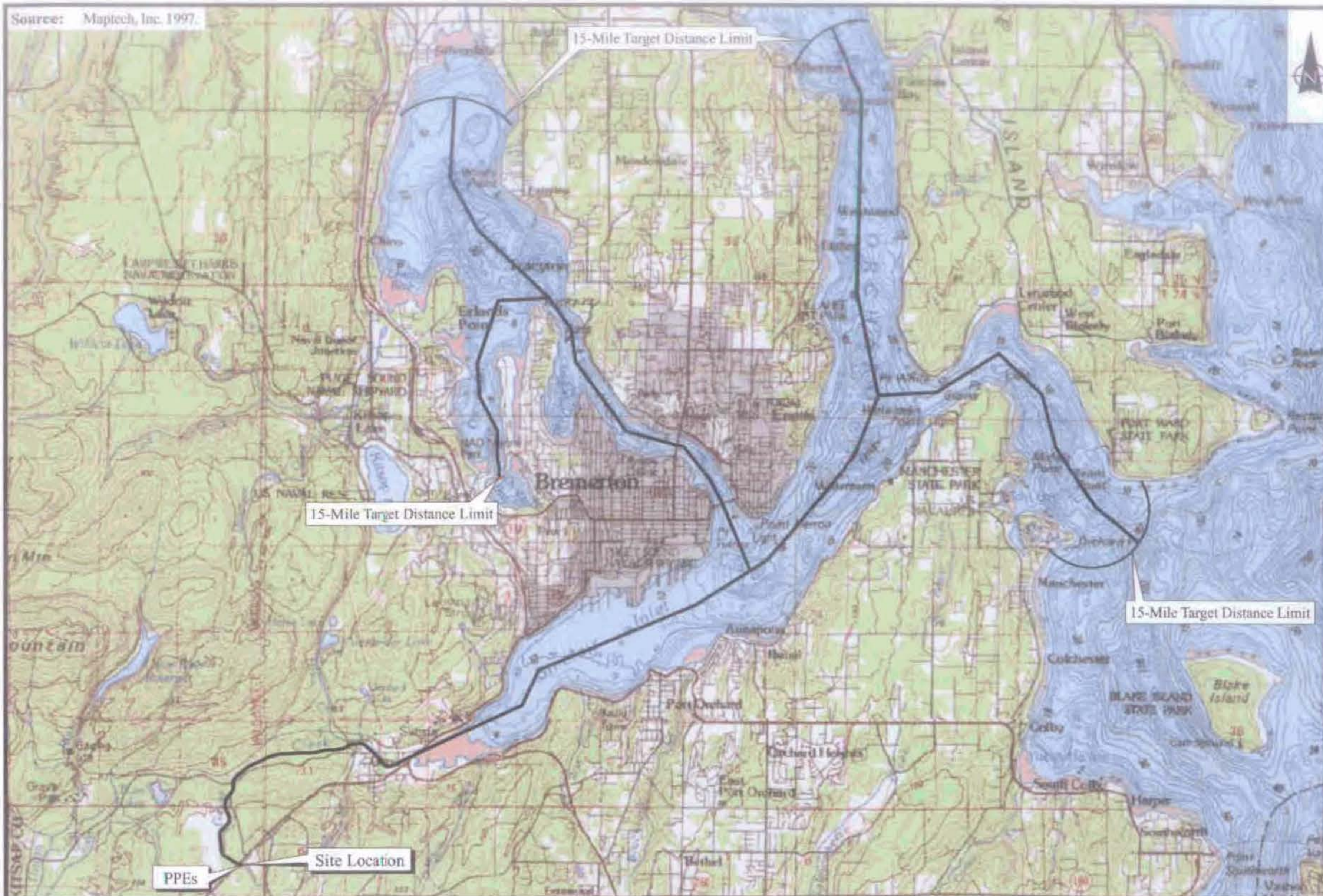
Port Orchard, Washington

0 1 2
Approximate Scale in Miles

Figure 7-1

4-MILE MAP

Date:	Drawn by:	
6-1-04	AES	10:START-2\03070009\S866\fig 7-1



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AUTO WRECKING LANDFILL
INTEGRATED ASSESSMENT
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0 .789 1.578
Approximate Scale in Miles

Figure 7-3
15-MILE MAP

Date:	Drawn by:	
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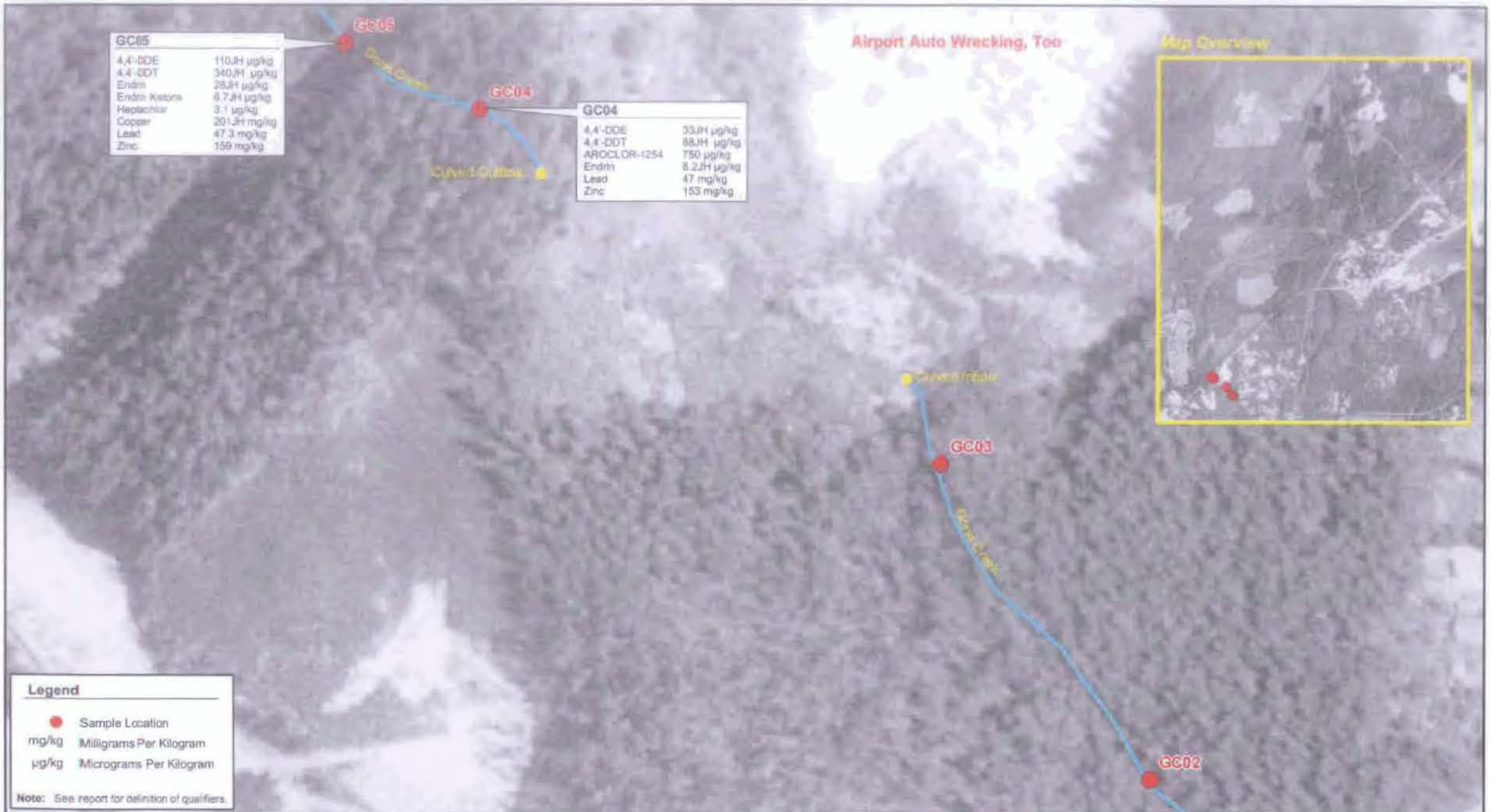

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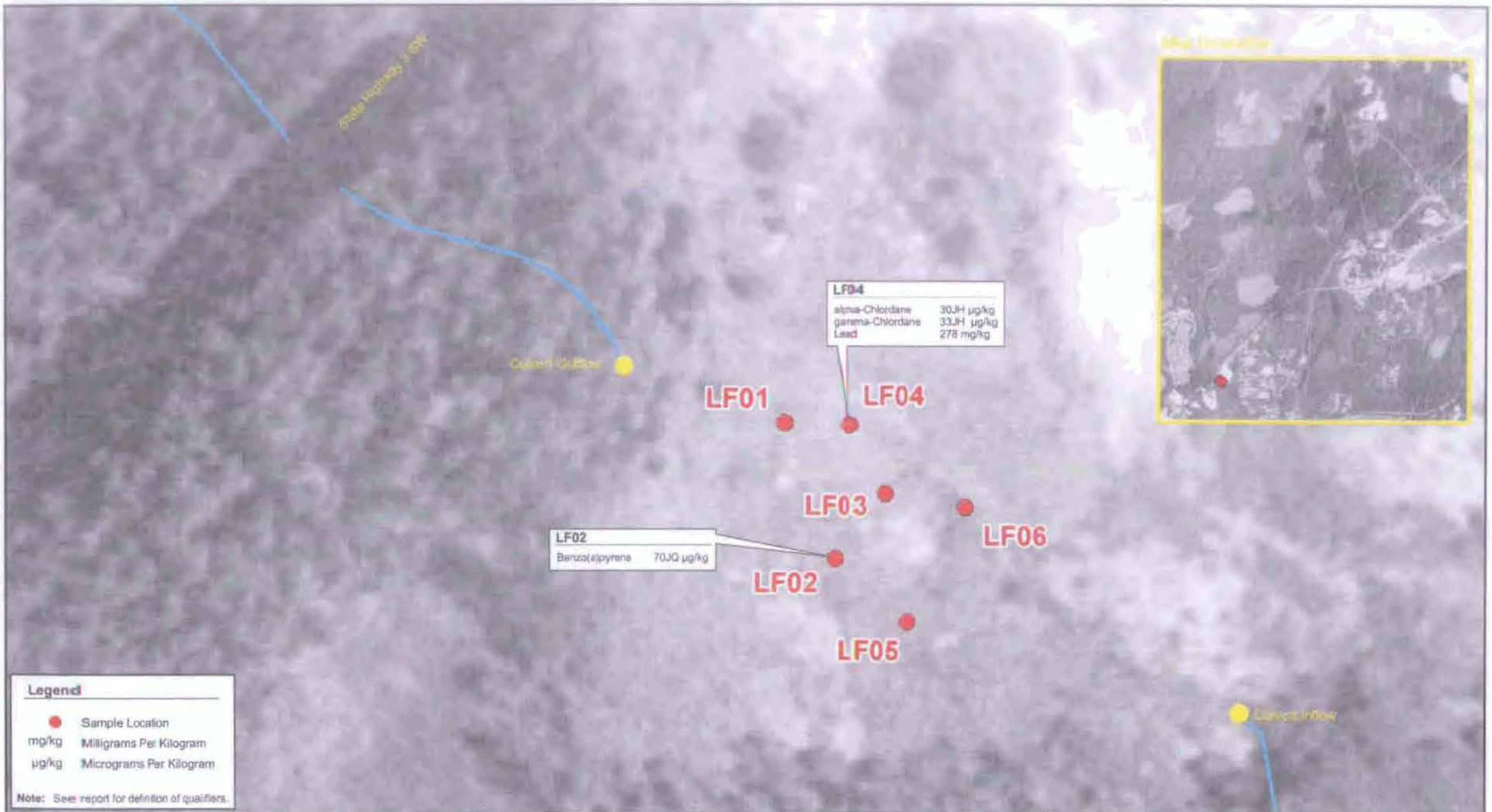
0 25 50 100 150 200 250 300 Feet

Map Reference: USGS Digital OrthoPhoto Quarter Quadrangle - Bremerton West, July 7, 1994

Gorst Creek - Bremerton Auto Wrecking Landfill
Integrated Assessment
Port Orchard, Washington

Figure 7-4
SEDIMENT SAMPLES CONCENTRATION MAP

Date:	Drawn by:	Job Number:
02/12/2004	avh	001281.0291.01IA



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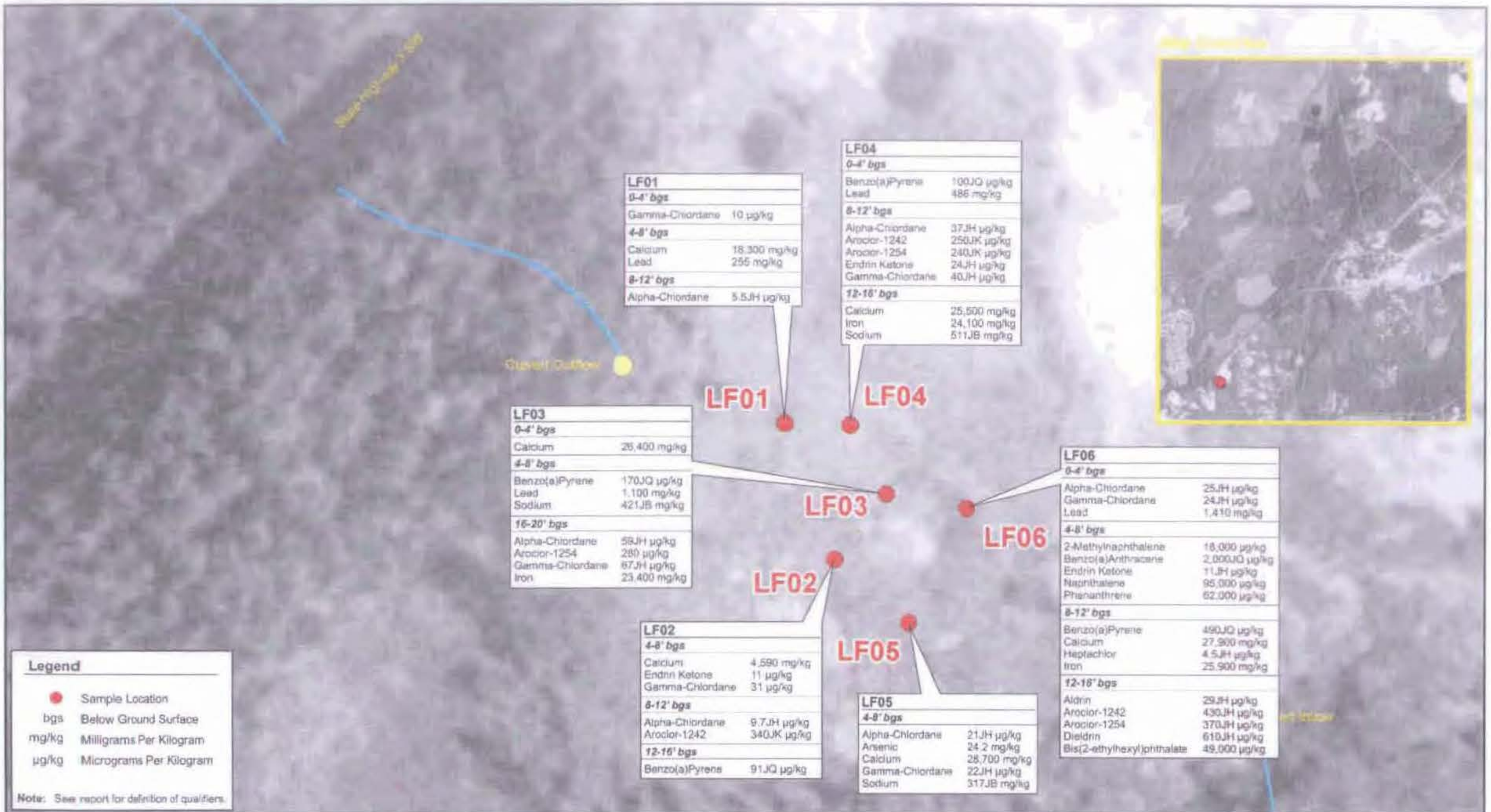
0 20 40 80 120 160 200
Feet

Map Reference: USGS Digital OrthoPhoto Quarter Quadrangle - Bremerton West, July 7, 1994

Gorst Creek - Bremerton Auto Wrecking Landfill
Integrated Assessment
Port Orchard, Washington

Figure 8-1
SURFACE SOIL SAMPLES CONCENTRATION MAP

Date:	Drawn by:	Job Number:
02/12/2004	avh	001281.0291.01IA



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Feet

Map Reference: USGS Digital OrthoPhoto Quarter Quadrangle - Bremerton West, July 7, 1994

Gorst Creek - Bremerton Auto Wrecking Landfill
Integrated Assessment
Port Orchard, Washington

Figure 8-2
SUBSURFACE SOIL SAMPLES CONCENTRATION MAP

Date:	Drawn by:	Job Number:
02/12/2004	avh	001281.0291.01IA

ecology and environment, inc. International Specialists in the Environment Portland, Oregon	0 250 500 1,000 1,500 2,000 2,500 Feet *Map Reference: USGS Quadrangle - Bremerton West*	Gorst Creek - Bremerton Auto Wrecking Landfill Integrated Assessment Port Orchard, Washington	Figure 8-3 SEDIMENT SAMPLE CONCENTRATION MAP Date: 02/12/2004 Drawn by: avh Job Number: 001281.0291.01IA

ecology and environment, inc. International Specialists in the Environment Seattle, Washington	N W E S 0 250 500 1,000 1,500 2,000 Feet ***Map Reference: USGS Digital OrthoPhoto Quarter Quadrangle - Bremerton West, July 7, 1994***	Gorst Creek - Bremerton Auto Wrecking Landfill Integrated Assessment Port Orchard, Washington	Figure 9-1 SUMMARY SAMPLE CONCENTRATION MAP Date: 02/12/2004 | Drawn by: avh | Job Number: 001281.0291.01IA

Table 1 - Analytical Results for Surface Soil Samples
Gorst Landfill
Gorst, Washington

Table 1a - TPH

Sample ID Sample Date		GL-SS-01 1/10/2000	GL-SS-02 1/10/2000	GL-SS-03 1/10/2000	GL-SS-04 1/10/2000	GL-SS-05 1/10/2000	GL-SS-06 1/10/2000	GL-SS-07 1/10/2000	GL-SS-08 1/10/2000
TPH in mg/kg	**MTCA Method A - Residential**								Field Duplicate of GL-SS-07
Gasoline (Toluene-C12)	100	6.7 U	5.9 U	5.9 U	5.6 U	5.4 U	6.1 U	6 U	6 U
Diesel (C12-C24)	200	14	14	64	26	11 U	12 U	12 U	12 U
Motor Oil (C24-C34)	200	130	110	190	140	44 U	49 U	48 U	48 U

U Not detected at indicated detection limit.

Table 1 - Analytical Results for Surface Soil Samples
Gorst Landfill
Gorst, Washington

Table 1b - PCBs and Pesticides

Sample ID Sample Date		GL-SS-01 1/10/2000	GL-SS-02 1/10/2000	GL-SS-03 1/10/2000	GL-SS-04 1/10/2000	GL-SS-05 1/10/2000	GL-SS-06 1/10/2000	GL-SS-07 1/10/2000	GL-SS-08 1/10/2000
PCBs/Pesticides in mg/kg	MTCA - Residential								Field Duplicate of GL-SS-07
Aroclor 1016	5.6	0.044 U	0.039 U	0.039 U	0.038 U	0.036 U	0.04 U	0.04 U	0.04 U
Aroclor 1221		0.044 U	0.039 U	0.039 U	0.038 U	0.036 U	0.04 U	0.04 U	0.04 U
Aroclor 1232		0.044 U	0.039 U	0.039 U	0.038 U	0.036 U	0.04 U	0.04 U	0.04 U
Aroclor 1242		0.044 U	0.039 U	0.039 U	0.038 U	0.036 U	0.04 U	0.04 U	0.04 U
Aroclor 1248		0.044 U	0.039 U	0.23	0.44	0.036 U	0.04 U	0.04 U	0.04 U
Aroclor 1254	1.6	0.044 U	0.039 U	0.039 U	0.038 U	0.14	0.04 U	0.04 U	0.04 U
Aroclor 1260		0.044 U	0.042	0.14	0.12	0.036 U	0.04 U	0.04 U	0.04 U
Total PCBs	1.0	0.044 U	0.042	0.37	0.56	0.14	0.04 U	0.04 U	0.04 U
4,4'-DDD	4.17	0.0044 U	0.004 U	0.004 U	0.037 J	0.0036 U	0.004 U	0.004 U	0.004 U
4,4'-DDE	2.94	0.0044 U	0.004 U	0.016 J	0.026 J	0.03 J	0.004 U	0.004 U	0.004 U
4,4'-DDT	2.94	0.0044 U	0.015 J	0.03 J	0.04 J	0.058	0.004 U	0.004 U	0.004 U
Aldrin	0.0588	0.0022 U	0.002 U	0.002 U	0.0019 U	0.0018 U	0.002 U	0.002 U	0.002 U
Alpha-BHC		0.0022 U	0.002 U	0.002 U	0.0019 U	0.0018 U	0.002 U	0.002 U	0.002 U
Alpha-Chlordane		0.0022 U	0.011 J	0.002 U	0.0019 U	0.0018 U	0.002 U	0.002 U	0.002 U
Beta-BHC		0.0022 U	0.002 U	0.002 U	0.0019 U	0.0018 U	0.002 U	0.002 U	0.002 U
Delta-BHC		0.0022 U	0.002 U	0.002 U	0.0019 U	0.0018 U	0.002 U	0.002 U	0.002 U
Dieldrin	0.0625	0.0044 U	0.004 U	0.017	0.029 J	0.038 J	0.004 U	0.004 U	0.004 U
Endosulfan I		0.0022 U	0.002 U	0.002 U	0.0019 U	0.01 J	0.002 U	0.002 U	0.002 U
Endosulfan II		0.0044 U	0.004 U	0.004 U	0.0038 U	0.0095 J	0.004 U	0.004 U	0.004 U
Endosulfan Sulfate		0.0044 U	0.009	0.004 U	0.0038 U	0.0036 U	0.004 U	0.004 U	0.004 U
Endrin	24	0.0044 U	0.004 U	0.004 U	0.0038 U	0.0077 J	0.004 U	0.004 U	0.004 U
Endrin Aldehyde		0.0044 U	0.004 U	0.004 U	0.0038 U	0.0036 U	0.004 U	0.004 U	0.004 U
Endrin Ketone		0.0044 U	0.004 U	0.005	0.0038 U	0.0036 U	0.004 U	0.004 U	0.004 U
Gamma-BHC (Lind	0.769	0.0022 U	0.002 U	0.002 U	0.0019 U	0.0018 U	0.002 U	0.002 U	0.002 U
Gamma-Chlordane		0.0022 U	0.008	0.009 J	0.015 J	0.02 J	0.002 U	0.002 U	0.002 U
Heptachlor	0.222	0.0022 U	0.002 U	0.002 U	0.0019 U	0.0018 U	0.002 U	0.002 U	0.002 U
Heptachlor Epoxide	0.11	0.0022 U	0.002 U	0.007 J	0.0019 U	0.0087 J	0.002 U	0.002 U	0.002 U
Methoxychlor	400	0.022 U	0.020 U	0.02 U	0.019 U	0.018 U	0.02 U	0.02 U	0.02 U
Toxaphene	0.909	0.044 U	0.039 U	0.039 U	0.038 U	0.036 U	0.04 U	0.04 U	0.04 U

U Not detected at indicated detection limit. J Estimated value.
All MTCA Residential Criteria are Method B, except for Total PCBs, which are Method A.

Table 1 - Analytical Results for Surface Soil Samples
Gorst Landfill
Gorst, Washington

Table 1c - Priority Pollutant Metals

Sample ID / Sample Date			GL-SS-01 1/10/2000	GL-SS-02 1/10/2000	GL-SS-03 1/10/2000	GL-SS-04 1/10/2000	GL-SS-05 1/10/2000	GL-SS-06 1/10/2000	GL-SS-07 1/10/2000	GL-SS-08 1/10/2000
Metals in mg/kg	**MTCA Method A - Residential**	**MTCA Method B- Residential**								Field Duplicate of GL-SS-07
Antimony		32	3.6 U	3.0 U	5.9	3.1 U	4.7	3.2 U	3.3 U	3.2 U
Arsenic	20	1.67	2.3	5.2	1.7	1.2	0.91	1.6	1.6	1.4
Beryllium		0.233	*0.36 U*	*0.3 U*	*0.32 U*	*0.31 U*	*0.3 U*	*0.32 U*	*0.33 U*	*0.32 U*
Cadmium	2	80	0.36 U	1	0.83	0.31 U	0.3 U	0.32 U	0.33 U	0.32 U
Chromium	100		23	28	30.3	25.2	22.4	19	27.9	19.8
Copper		2,960	12.5	34.1	64.8	30.7	22.3	10	13	11.7
Lead	250		10	235	57.9	32.8	17.8	12.7	16.3	10.6
Mercury	1	24	0.045 U	0.1	0.25	0.094	0.046	0.046 U	0.047 U	0.049 U
Nickel		1,600	32.1	35.7	44	28.5	34.3	24.4	35.4	32.1
Selenium		400	1.8 UJ	1.6 UJ	1.6 UJ	1.4 UJ	1.5 UJ	1.6 UJ	1.6 UJ	1.5 UJ
Silver		400	0.73 U	0.59 U	0.64 U	0.61 U	0.59 U	0.65 U	0.66 U	0.64 U
Thallium		5.6	0.36 U	0.32 U	0.32 U	0.28 U	0.29 U	0.32 U	0.31 U	0.31 U
Zinc		2,400	31.5	178	235	105	77.4	27.7	44.5	40.3

U Not detected at indicated detection limit.
J Estimated value.
Italicized reporting limits are greater than the screening criteria.

Table 1 - Analytical Results for Surface Soil Samples
Gorst Landfill
Gorst, Washington

Table 1d - TCLP Metals

Sample ID Sample Date		GL-SS-01 1/10/2000	GL-SS-02 1/10/2000	GL-SS-03 1/10/2000	GL-SS-04 1/10/2000	GL-SS-05 1/10/2000	GL-SS-06 1/10/2000	GL-SS-07 1/10/2000	GL-SS-08 1/10/2000
Metals in ug/L	**EPA Criteria**								Field Duplicate of GL-SS-07
Antimony		50 U	50 U	50 U	50 U	50 U	50 U	50.0 U	50.0 U
Arsenic	5,000	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U
Beryllium		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Cadmium	1,000	5 U	9.5	10.9	5.9	5 U	5 U	5 U	5 U
Chromium	5,000	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Copper	5,000	10 U	16.6 U	170 U	69.1 U	40.7 U	10 U	10 U	10 U
Lead	5,000	30 U	437	64.4	43.2	49.1	30 U	30 U	30 U
Mercury	200	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U
Nickel	5,000	10 U	10 U	44.6	24.4	16.4	10 U	10 U	10 U
Selenium	1,000	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U
Silver	5,000	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Thallium		200 U	200 U	200 U	200 U	200 U	200 U	200 U	200 U
Zinc	5,000	150 U	812	1,670	765	540	176 U	170 U	148 U

U Not detected at indicated detection limit.

Table 1 - Analytical Results for Surface Soil Samples
Gorst Landfill
Gorst, Washington

Table 1e - Volatile Organic Compounds

Sample ID Sample Date		GL-SS-01 1/10/2000	GL-SS-02 1/10/2000	GL-SS-03 1/10/2000	GL-SS-04 1/10/2000	GL-SS-05 1/10/2000	GL-SS-06 1/10/2000	GL-SS-07 1/10/2000	GL-SS-08 1/10/2000
VOCs in mg/kg	**MTCA Method B-Residential**								Field Duplicate of GL-SS-07
1,1,1-Trichloroethane	72,000	0.013 U	0.012 U	0.012 U	0.011 U	0.011 U	0.012 U	0.012 U	0.012 U
1,1,2,2-Tetrachloroethane		0.013 U	0.012 U	0.012 U	0.011 U	0.011 U	0.012 U	0.012 U	0.012 U
1,1,2-Trichloroethane	17.5	0.013 U	0.012 U	0.012 U	0.011 U	0.011 U	0.012 U	0.012 U	0.012 U
1,1-Dichloroethane	8,000	0.013 U	0.012 U	0.012 U	0.011 U	0.011 U	0.012 U	0.012 U	0.012 U
1,1-Dichloroethene	1.67	0.013 U	0.012 U	0.012 U	0.011 U	0.011 U	0.012 U	0.012 U	0.012 U
1,2-Dichloroethane	11	0.013 U	0.012 U	0.012 U	0.011 U	0.011 U	0.012 U	0.012 U	0.012 U
1,2-Dichloroethene (Total)	2,400	0.013 U	0.012 U	0.012 U	0.011 U	0.011 U	0.012 U	0.012 U	0.012 U
1,2-Dichloropropane	14.7	0.013 U	0.012 U	0.012 U	0.011 U	0.011 U	0.012 U	0.012 U	0.012 U
2-Butanone	48,000	0.013 U	0.012 U	0.012 U	0.011 U	0.011 U	0.012 U	0.012 U	0.012 U
2-Hexanone		0.013 U	0.012 U	0.012 U	0.011 U	0.011 U	0.012 U	0.012 U	0.012 U
4-Methyl-2-Pentanone	6,400	0.013 U	0.012 U	0.012 U	0.011 U	0.011 U	0.012 U	0.012 U	0.012 U
Acetone	8,000	0.013 U	0.012 U	0.012 U	0.011 U	0.011 U	0.012 U	0.012 U	0.012 U
Benzene	34.5	0.013 U	0.012 U	0.012 U	0.011 U	0.011 U	0.012 U	0.012 U	0.012 U
Bromodichloromethane	16.1	0.013 U	0.012 U	0.012 U	0.011 U	0.011 U	0.012 U	0.012 U	0.012 U
Bromoform	127	0.013 U	0.012 U	0.012 U	0.011 U	0.011 U	0.012 U	0.012 U	0.012 U
Bromomethane	112	0.013 U	0.012 U	0.012 U	0.011 U	0.011 U	0.012 U	0.012 U	0.012 U
Carbon Disulfide	8,000	0.013 U	0.012 U	0.012 U	0.011 U	0.011 U	0.012 U	0.012 U	0.012 U
Carbon Tetrachloride	7.69	0.013 U	0.012 U	0.012 U	0.011 U	0.011 U	0.012 U	0.012 U	0.012 U
Chlorobenzene	1,600	0.013 U	0.012 U	0.012 U	0.011 U	0.011 U	0.012 U	0.012 U	0.012 U
Chloroethane		0.013 U	0.012 U	0.012 U	0.011 U	0.011 U	0.012 U	0.012 U	0.012 U
Chloroform	164	0.013 U	0.012 U	0.012 U	0.011 U	0.011 U	0.012 U	0.012 U	0.012 U
Chloromethane	76.9	0.013 U	0.012 U	0.012 U	0.011 U	0.011 U	0.012 U	0.012 U	0.012 U
Cis-1,3-Dichloropropene		0.013 U	0.012 U	0.012 U	0.011 U	0.011 U	0.012 U	0.012 U	0.012 U
Dibromochloromethane	11.9	0.013 U	0.012 U	0.012 U	0.011 U	0.011 U	0.012 U	0.012 U	0.012 U
Ethylbenzene	8,000	0.013 U	0.012 U	0.012 U	0.011 U	0.011 U	0.012 U	0.012 U	0.012 U
Methylene Chloride		0.013 U	0.012 U	0.012 U	0.011 U	0.011 U	0.012 U	0.012 U	0.012 U
Styrene	33.3	0.013 U	0.012 U	0.012 U	0.011 U	0.011 U	0.012 U	0.012 U	0.012 U
Tetrachloroethene	19.6	0.013 U	0.012 U	0.012 U	0.011 U	0.011 U	0.012 U	0.012 U	0.012 U
Toluene	16,000	0.013 U	0.012 U	0.012 U	0.011 U	0.011 U	0.012 U	0.012 U	0.012 U
Trans-1,3-Dichloropropene		0.013 U	0.012 U	0.012 U	0.011 U	0.011 U	0.012 U	0.012 U	0.012 U
Trichloroethene	90.9	0.013 U	0.012 U	0.012 U	0.011 U	0.011 U	0.012 U	0.012 U	0.012 U
Vinyl Chloride	0.526	0.013 U	0.012 U	0.012 U	0.011 U	0.011 U	0.012 U	0.012 U	0.012 U
Xylene (Total)	160,000	0.013 U	0.012 U	0.012 U	0.011 U	0.011 U	0.012 U	0.012 U	0.012 U

(a) MTCA Criteria presented are sum of cis and trans 1,2-dichloroethene.

U Not detected at indicated detection limit.

Gorst Landfill

Gorst, Washington

Table 1f - Semivolatile Organic Compounds

Sample ID / Sample Date		GL-SS-01 1/10/2000	GL-SS-02 1/10/2000	GL-SS-03 1/10/2000	GL-SS-04 1/10/2000	GL-SS-05 1/10/2000	GL-SS-06 1/10/2000	GL-SS-07 1/10/2000	GL-SS-08 1/10/2000
SVOCs in mg/kg	MTCA - Residential								Field Duplicate of GL-SS-07
1,2,4-Trichlorobenzene	800	0.44 U	0.39 U	0.39 U	0.37 U	0.36 U	0.4 U	0.4 U	0.4 U
1,2-Dichlorobenzene	7,200	0.44 U	0.39 U	0.39 U	0.37 U	0.36 U	0.4 U	0.4 U	0.4 U
1,3-Dichlorobenzene		0.44 U	0.39 U	0.39 U	0.37 U	0.36 U	0.4 U	0.4 U	0.4 U
1,4-Dichlorobenzene	41.7	0.44 U	0.39 U	0.39 U	0.37 U	0.36 U	0.4 U	0.4 U	0.4 U
2,2'-Oxybis(1-Chloropropane)		0.44 U	0.39 U	0.39 U	0.37 U	0.36 U	0.4 U	0.4 U	0.4 U
2,4,5-Trichlorophenol	8,000	1.1 U	0.98 U	0.97 U	0.93 U	0.91 U	1 U	1 U	1 U
2,4,6-Trichlorophenol	90.9	0.44 U	0.39 U	0.39 U	0.37 U	0.36 U	0.4 U	0.4 U	0.4 U
2,4-Dichlorophenol	240	0.44 U	0.39 U	0.39 U	0.37 U	0.36 U	0.4 U	0.4 U	0.4 U
2,4-Dimethylphenol	1,600	0.44 U	0.39 U	0.39 U	0.37 U	0.36 U	0.4 U	0.4 U	0.4 U
2,4-Dinitrophenol	160	1.1 U	0.98 U	0.97 U	0.93 U	0.91 U	1 U	1 U	1 U
2,4-Dinitrotoluene	160	0.44 U	0.39 U	0.39 U	0.37 U	0.36 U	0.4 U	0.4 U	0.4 U
2,6-Dinitrotoluene	80	0.44 U	0.39 U	0.39 U	0.37 U	0.36 U	0.4 U	0.4 U	0.4 U
2-Chloronaphthalene		0.44 U	0.39 U	0.39 U	0.37 U	0.36 U	0.4 U	0.4 U	0.4 U
2-Chlorophenol	400	0.44 U	0.39 U	0.39 U	0.37 U	0.36 U	0.4 U	0.4 U	0.4 U
2-Methylnaphthalene		0.44 U	0.013 J	0.39 U	0.37 U	0.36 U	0.4 U	0.4 U	0.4 U
2-Methylphenol		0.44 U	0.39 U	0.39 U	0.37 U	0.36 U	0.4 U	0.4 U	0.4 U
2-Nitroaniline		1.1 U	0.98 U	0.97 U	0.93 U	0.91 U	1 U	1 U	1 U
2-Nitrophenol		0.44 U	0.39 U	0.39 U	0.37 U	0.36 U	0.4 U	0.4 U	0.4 U
3,3'-Dichlorobenzidine	2.22	0.44 U	0.39 U	0.39 U	0.37 U	0.36 U	0.4 U	0.4 U	0.4 U
3-Nitroaniline		1.1 U	0.98 U	0.97 U	0.93 U	0.91 U	1 U	1 U	1 U
4,6-Dinitro-2-Methylphenol		1.1 U	0.98 U	0.97 U	0.93 U	0.91 U	1 U	1 U	1 U
4-Bromophenyl-Phenylether		0.44 U	0.39 U	0.39 U	0.37 U	0.36 U	0.4 U	0.4 U	0.4 U
4-Chloro-3-Methylphenol		0.44 U	0.39 U	0.39 U	0.37 U	0.36 U	0.4 U	0.4 U	0.4 U
4-Chloroaniline	320	0.44 U	0.39 U	0.39 U	0.37 U	0.36 U	0.4 U	0.4 U	0.4 U
4-Chlorophenyl-Phenylether		0.44 U	0.39 U	0.39 U	0.37 U	0.36 U	0.4 U	0.4 U	0.4 U
4-Methylphenol		0.44 U	0.39 U	0.39 U	0.37 U	0.36 U	0.4 U	0.4 U	0.4 U
4-Nitroaniline		1.1 U	0.98 U	0.97 U	0.93 U	0.91 U	1 U	1 U	1 U
4-Nitrophenol		1.1 U	0.98 U	0.97 U	0.93 U	0.91 U	1 U	1 U	1 U
Acenaphthene	4,800	0.44 U	0.026 J	0.39 U	0.37 U	0.36 U	0.4 U	0.4 U	0.4 U
Acenaphthylene		0.44 U	0.014 J	0.39 U	0.37 U	0.36 U	0.4 U	0.4 U	0.4 U
Anthracene	24,000	0.44 U	0.067 J	0.39 U	0.37 U	0.36 U	0.4 U	0.4 U	0.4 U
Benzo(a)anthracene	0.137	*0.44 U*	0.15 J	*0.39 U*	*0.37 U*	*0.36 U*	*0.4 U*	*0.4 U*	*0.4 U*
Benzo(a)pyrene	0.137	*0.44 U*	0.14 J	0.016 J	*0.37 U*	0.015 J	*0.4 U*	*0.4 U*	*0.4 U*
Benzo(b)fluoranthene	0.137	*0.44 U*	0.12	0.009 J	0.006 J	*0.36 U*	*0.4 U*	0.4	*0.4 U*
Benzo(k)fluoranthene	0.137	*0.44 U*	0.1	0.005 J	0.003 J	*0.36 U*	*0.4 U*	0.4	*0.4 U*
Total Benzofluoranthenes		0.44 U	0.22	0.014 J	0.009 J	0.36 U	0.4 U	0.8	0.4 U

Gorst Landfill

Gorst, Washington

Table 1f - Semivolatile Organic Compounds

Sample ID / Sample Date		GL-SS-01	GL-SS-02	GL-SS-03	GL-SS-04	GL-SS-05	GL-SS-06	GL-SS-07	GL-SS-08
		1/10/2000	1/10/2000	1/10/2000	1/10/2000	1/10/2000	1/10/2000	1/10/2000	1/10/2000
SVOCs in mg/kg	MTCA - Residential								Field Duplicate of GL-SS-07
Chrysene	0.137	*0.44 U*	0.18 J	*0.39 U*	*0.37 U*	*0.36 U*	*0.4 U*	*0.4 U*	*0.4 U*
Dibenz(a,h)anthracene	0.137	*0.44 U*	0.03 J	*0.39 U*	*0.37 U*	*0.36 U*	*0.4 U*	*0.4 U*	*0.4 U*
Indeno(1,2,3-cd)pyrene	0.137	*0.44 U*	0.088 J	*0.39 U*	*0.37 U*	*0.36 U*	*0.4 U*	*0.4 U*	*0.4 U*
Total cPAHs	1.0	0.44 U	0.72	0.03 J	0.009 J	0.015 J	0.4 U	0.8	0.4 U
Benzo(g,h,i)Perylene		0.44 U	0.096 J	0.011 J	0.37 U	0.36 U	0.4 U	0.4 U	0.4 U
Bis(2-Chloroethoxy)Methane		0.44 U	0.39 U	0.39 U	0.37 U	0.36 U	0.4 U	0.4 U	0.4 U
Bis(2-Chloroethyl)Ether	0.909	0.44 U	0.39 U	0.39 U	0.37 U	0.36 U	0.4 U	0.4 U	0.4 U
Bis(2-Ethylhexyl)Phthalate	71.4	0.44 U	0.39 U	0.39 U	0.37 U	0.36 U	0.4 U	0.4 U	0.4 U
Butylbenzylphthalate	16,000	0.016 J	0.15 J	0.048 J	0.031 J	0.024 J	0.009 J	0.4 U	0.009 J
Carbazole	50	0.44 U	0.034 J	0.39 U	0.37 U	0.36 U	0.4 U	0.4 U	0.4 U
Di-N-Butylphthalate	8,000	0.44 U	0.39 U	0.39 U	0.028 J	0.36 U	0.4 U	0.4 U	0.4 U
Di-N-Octylphthalate	1,600	0.44 U	0.39 U	0.39 U	0.37 U	0.36 U	0.4 U	0.4 U	0.4 U
Dibenzofuran		0.44 U	0.013 J	0.39 U	0.37 U	0.36 U	0.4 U	0.4 U	0.4 U
Diethylphthalate	64,000	0.44 U	0.39 U	0.39 U	0.37 U	0.36 U	0.4 U	0.4 U	0.4 U
Dimethylphthalate	80,000	0.44 U	0.089 J	0.39 U	0.37 U	0.36 U	0.4 U	0.4 U	0.4 U
Fluoranthene	3,200	0.44 U	0.28 J	0.39 U	0.37 U	0.36 U	0.4 U	0.4 U	0.4 U
Fluorene	3,200	0.44 U	0.032 J	0.39 U	0.37 U	0.36 U	0.4 U	0.4 U	0.4 U
Hexachlorobenzene	0.625	0.44 U	0.39 U	0.39 U	0.37 U	0.36 U	0.4 U	0.4 U	0.4 U
Hexachlorobutadiene	12.8	0.44 U	0.39 U	0.39 U	0.37 U	0.36 U	0.4 U	0.4 U	0.4 U
Hexachlorocyclopentadiene	560	0.44 U	0.39 U	0.39 U	0.37 U	0.36 U	0.4 U	0.4 U	0.4 U
Hexachloroethane	71.4	0.44 U	0.39 U	0.39 U	0.37 U	0.36 U	0.4 U	0.4 U	0.4 U
Isophorone	1,050	0.44 U	0.39 U	0.39 U	0.37 U	0.36 U	0.4 U	0.4 U	0.4 U
N-Nitroso-Di-N-Propylamine	0.143	*0.44 U*	*0.39 U*	*0.39 U*	*0.37 U*	*0.36 U*	*0.4 U*	*0.4 U*	*0.4 U*
N-Nitrosodiphenylamine	204	0.44 U	0.39 U	0.39 U	0.37 U	0.36 U	0.4 U	0.4 U	0.4 U
Naphthalene	3,200	0.44 U	0.032 J	0.39 U	0.37 U	0.36 U	0.4 U	0.4 U	0.4 U
Nitrobenzene	40	0.44 U	0.39 U	0.39 U	0.37 U	0.36 U	0.4 U	0.4 U	0.4 U
Pentachlorophenol	8.33	1.1 U	0.98 U	0.97 U	0.93 U	0.91 U	1 U	1 U	1 U
Phenanthrene		0.44 U	0.28 J	0.39 U	0.37 U	0.36 U	0.4 U	0.4 U	0.4 U
Phenol	48,000	0.44 U	0.39 U	0.39 U	0.37 U	0.36 U	0.4 U	0.4 U	0.4 U
Pyrene	2,400	0.44 U	0.29 J	0.009 J	0.009 J	0.36 U	0.4 U	0.4 U	0.4 U

Italicized reporting limits are greater than screening criteria.

U Not detected at indicated detection limit. J Estimated value.

All MTCA Residential Criteria are Method B, except for Total cPAHs, which are Method A.

Table 2 - Analytical Results for Freshwater Sediment Samples
Gorst Landfill
Gorst, Washington

Table 2a - TPH

Sample ID Sample Date		GL-SED-01 1/10/2000	GL-SED-02 1/11/2000	GL-SED-03 1/11/2000	GL-SED-04 1/11/2000
TPH in mg/kg	No Available Criteria				
Gasoline (Toluene-C12)		6.5 U	9.6 U	6.1 U	6.1 U
Diesel (C12-C24)		13 U	44	12 U	12 U
Motor Oil (C24-C34)		52 U	400	49 U	49 U

U Not detected at indicated detection limit.

Table 2 - Analytical Results for Freshwater Sediment Samples
Gorst Landfill
Gorst, Washington

Table 2b - PCBs and Pesticides

Sample ID Sample Date			GL-SED-01 1/10/2000	GL-SED-02 1/11/2000	GL-SED-03 1/11/2000	GL-SED-04 1/11/2000
PCBs/Pesticides in mg/kg	FSQV[a]	EcoTox Thresholds[b]				
Aroclor 1016			0.043 U	0.064 U	0.041 U	0.041 U
Aroclor 1221			0.043 U	0.064 U	0.041 U	0.041 U
Aroclor 1232			0.043 U	0.064 U	0.041 U	0.041 U
Aroclor 1242			0.043 U	0.064 U	0.041 U	0.041 U
Aroclor 1248	0.021		*0.043 U*	*0.064 U*	*0.041 U*	*0.041 U*
Aroclor 1254	0.0073		*0.043 U*	*0.064 U*	*0.041 U*	*0.041 U*
Aroclor 1260			0.043 U	0.064 U	0.041 U	0.041 U
Total Aroclors	0.021	0.023	*0.043 U*	*0.064 U*	*0.041 U*	*0.041 U*
4,4'-DDD			0.0043 U	0.0064 U	0.0041 U	0.0041 U
4,4'-DDE			0.0043 U	0.0064 U	0.0041 U	0.0041 U
4,4'-DDT		0.0016	*0.0043 U*	0.012 J	*0.0041 U*	*0.0041 U*
Aldrin			0.0022 U	0.0032 U	0.002 U	0.002 U
Alpha-BHC			0.0022 U	0.0032 U	0.002 U	0.002 U
Alpha-Chlordane			0.0022 U	0.0032 U	0.002 U	0.002 U
Beta-BHC			0.0022 U	0.0032 U	0.002 U	0.002 U
Delta-BHC			0.0022 U	0.0032 U	0.002 U	0.002 U
Dieldrin		0.052	0.0043 U	0.0064 U	0.0041 U	0.0041 U
Endosulfan I		0.0029	0.0022 U	*0.0032 U*	0.002 U	0.002 U
Endosulfan II		0.014	0.0043 U	0.0064 U	0.0041 U	0.0041 U
Endosulfan Sulfate			0.0043 U	0.0064 U	0.0041 U	0.0041 U
Endrin		0.02	0.0043 U	0.0064 U	0.0041 U	0.0041 U
Endrin Aldehyde			0.0043 U	0.0064 U	0.0041 U	0.0041 U
Endrin Ketone			0.0043 U	0.0064 U	0.0041 U	0.0041 U
Gamma-BHC (Lindane)		0.0037	0.0022 U	0.0032 U	0.002 U	0.002 U
Gamma-Chlordane			0.0022 U	0.0032 U	0.002 U	0.002 U
Heptachlor			0.0022 U	0.0032 U	0.002 U	0.002 U
Heptachlor Epoxide			0.0022 U	0.0032 U	0.002 U	0.002 U
Methoxychlor		0.019	*0.022 U*	*0.032 U*	*0.02 U*	*0.02 U*
Toxaphene		0.028	*0.043 U*	*0.064 U*	*0.041 U*	*0.041 U*

Italicized reporting limits are greater than at least one screening criteria.

(a) Washington State Department of Ecology, Creation and Analysis of Freshwater Sediment Quality Values in Washington State, July 1997.

(b) Lowest Sediment Criteria presented in Ecotox Thresholds, (EPA, 1996).

U Not detected at indicated detection limit.

J Estimated value.

Value exceeds screening criteria.

Table 2 - Analytical Results for Freshwater Sediment Samples
Gorst Landfill
Gorst, Washington

Table 2c - Priority Pollutant Metals

Sample ID Sample Date		GL-SED-01 1/10/2000	GL-SED-02 1/11/2000	GL-SED-03 1/11/2000	GL-SED-04 1/11/2000
Metals in mg/kg	FSQV[a]				
Antimony		3.4 U	7.6	3.2 U	3.2 U
Arsenic	57	2	3.5	27.7	2.1
Beryllium		0.34 U	0.52 U	0.32 U	0.32 U
Cadmium	5.1	0.34 U	0.52 U	0.32 U	0.32 U
Chromium	260	35.7	30.5	17.3	30.3
Copper	390	11.3	159	12.7	19.7
Lead	450	4.2	113	16.6	12.4
Mercury	0.41	0.047 U	0.075 U	0.045 U	0.046 U
Nickel		54	53.2	23.1	32.1
Selenium		1.6 UJ	2.4 UJ	0.62 UJ	0.67 UJ
Silver	6.1	0.67 U	1 U	0.63 U	0.64 U
Thallium		0.33 U	0.49 U	0.31 U	0.34 U
Zinc	410	45.4	108	76.4	97.3

(a) Washington State Department of Ecology, Creation and Analysis of Freshwater Sediment Quality Values in Washington State, July 1997.
U Not detected at indicated detection limit.
J Estimated value.

Table 2 - Analytical Results for Freshwater Sediment Samples
Gorst Landfill
Gorst, Washington

Table 2d - TCLP Metals

Sample ID Sample Date		GL-SED-01 1/10/2000	GL-SED-02 1/11/2000	GL-SED-03 1/11/2000	GL-SED-04 1/11/2000
Metals in ug/L	**No Available Criteria**				
Antimony		50 U	50 U	50 U	50 U
Arsenic		100 U	100 U	100 U	100 U
Beryllium		5 U	5 U	5 U	5 U
Cadmium		5 U	5 U	5 U	5 U
Chromium		10 U	10 U	10 U	10 U
Copper		10 U	80.2 U	14.3 U	26.8 U
Lead		30 U	37	30 U	30 U
Mercury		0.4 U	0.4 U	0.4 U	0.4 U
Nickel		11	10 U	12.8	11.8
Selenium		100 U	100 U	100 U	100 U
Silver		10 U	10 U	10 U	10 U
Thallium		200 U	200 U	200 U	200 U
Zinc		303 U	366 U	402 U	426 U

U Not detected at indicated detection limit.

[illegible] 2 - Analytical Results for Freshwater Sediment Samples
Gorst Landfill
Gorst, Washington

Table 2e - Volatiles Organic Compounds

Sample ID		GL-SED-01	GL-SED-02	GL-SED-03	GL-SED-04
Sample Date		1/10/2000	1/11/2000	1/11/2000	1/11/2000
VOCs in mg/kg	EcoTox Thresholds[b]				
1,1,1-Trichloroethane	0.17	0.013 U	0.019 U	0.012 U	0.012 U
1,1,2,2-Tetrachloroethane		0.013 U	0.019 U	0.012 U	0.012 U
1,1,2-Trichloroethane		0.013 U	0.019 U	0.012 U	0.012 U
1,1-Dichloroethane		0.013 U	0.019 U	0.012 U	0.012 U
1,1-Dichloroethene		0.013 U	0.019 U	0.012 U	0.012 U
1,2-Dichloroethane		0.013 U	0.019 U	0.012 U	0.012 U
1,2-Dichloroethene (Total)		0.013 U	0.019 U	0.012 U	0.012 U
1,2-Dichloropropane		0.013 U	0.019 U	0.012 U	0.012 U
2-Butanone		0.013 U	0.019 U	0.012 U	0.012 U
2-Hexanone		0.013 U	0.019 U	0.012 U	0.012 U
4-Methyl-2-Pentanone		0.013 U	0.019 U	0.012 U	0.012 U
Acetone		0.013 U	0.019 U	0.012 U	0.012 U
Benzene	0.057	0.013 U	0.019 U	0.012 U	0.012 U
Bromodichloromethane		0.013 U	0.019 U	0.012 U	0.012 U
Bromoform		0.013 U	0.019 U	0.012 U	0.012 U
Bromomethane		0.013 U	0.019 U	0.012 U	0.012 U
Carbon Disulfide		0.013 U	0.019 U	0.012 U	0.012 U
Carbon Tetrachloride		0.013 U	0.019 U	0.012 U	0.012 U
Chlorobenzene	0.82	0.013 U	0.019 U	0.012 U	0.012 U
Chloroethane		0.013 U	0.019 U	0.012 U	0.012 U
Chloroform		0.013 U	0.019 U	0.012 U	0.012 U
Chloromethane		0.013 U	0.019 U	0.012 U	0.012 U
Cis-1,3-Dichloropropene		0.013 U	0.019 U	0.012 U	0.012 U
Dibromochloromethane		0.013 U	0.019 U	0.012 U	0.012 U
Ethylbenzene	3.6	0.013 U	0.019 U	0.012 U	0.012 U
Methylene Chloride		0.013 U	0.019 U	0.012 U	0.012 U
Styrene		0.013 U	0.019 U	0.012 U	0.012 U
Tetrachloroethene	0.53	0.013 U	0.019 U	0.012 U	0.012 U
Toluene	0.67	0.013 U	0.019 U	0.012 U	0.012 U
Trans-1,3-Dichloropropene		0.013 U	0.019 U	0.012 U	0.012 U
Trichloroethene	1.6	0.013 U	0.019 U	0.012 U	0.012 U
Vinyl Chloride		0.013 U	0.019 U	0.012 U	0.012 U
Xylene (Total)	0.025	0.013 U	0.019 U	0.012 U	0.012 U

(a) MTCA Criteria presented are sum of cis and trans 1,2-dichloroethene.
(b) Lowest Sediment Criteria presented in Ecotox Thresholds, (EPA, 1996).

U Not detected at indicated detection limit.

Table 2 - Analytical Results for Freshwater Sediment Samples
Gorst Landfill
Gorst, Washington

Table 2f - Semivolatile Organic Compounds

Sample ID Sample Date			GL-SED-01 1/10/2000	GL-SED-02 1/11/2000	GL-SED-03 1/11/2000	GL-SED-04 1/11/2000
SVOCs in mg/kg	**FSQV[a]**	**EcoTox Thresholds[b]**				
1,2,4-Trichlorobenzene		9.2	0.43 U	0.64 U	0.4 U	0.4 U
1,2-Dichlorobenzene		0.34	*0.43 U*	*0.64 U*	*0.4 U*	*0.4 U*
1,3-Dichlorobenzene		1.7	0.43 U	0.64 U	0.4 U	0.4 U
1,4-Dichlorobenzene		0.35	*0.43 U*	*0.64 U*	*0.4 U*	*0.4 U*
2,2'-Oxybis(1-Chloropropane)			0.43 U	0.64 U	0.4 U	0.4 U
2,4,5-Trichlorophenol			1.1 U	1.6 U	1 U	1 U
2,4,6-Trichlorophenol			0.43 U	0.64 U	0.4 U	0.4 U
2,4-Dichlorophenol			0.43 U	0.64 U	0.4 U	0.4 U
2,4-Dimethylphenol			0.43 U	0.64 U	0.4 U	0.4 U
2,4-Dinitrophenol			1.1 U	1.6 U	1 U	1 U
2,4-Dinitrotoluene			0.43 U	0.64 U	0.4 U	0.4 U
2,6-Dinitrotoluene			0.43 U	0.64 U	0.4 U	0.4 U
2-Chloronaphthalene			0.43 U	0.64 U	0.4 U	0.4 U
2-Chlorophenol			0.43 U	0.64 U	0.4 U	0.4 U
2-Methylnaphthalene			0.43 U	0.64 U	0.4 U	0.4 U
2-Methylphenol			0.43 U	0.64 U	0.4 U	0.4 U
2-Nitroaniline			1.1 U	1.6 U	1 U	1 U
2-Nitrophenol			0.43 U	0.64 U	0.4 U	0.4 U
3,3'-Dichlorobenzidine			0.43 U	0.64 U	0.4 U	0.4 U
3-Nitroaniline			1.1 U	1.6 U	1 U	1 U
4,6-Dinitro-2-Methylphenol			1.1 U	1.6 U	1 U	1 U
4-Bromophenyl-Phenylether			0.43 U	0.64 U	0.4 U	0.4 U
4-Chloro-3-Methylphenol			0.43 U	0.64 U	0.4 U	0.4 U
4-Chloroaniline			0.43 U	0.64 U	0.4 U	0.4 U
4-Chlorophenyl-Phenylether			0.43 U	0.64 U	0.4 U	0.4 U
4-Methylphenol			0.43 U	0.017 J	0.4 U	0.4 U
4-Nitroaniline			1.1 U	1.6 U	1 U	1 U
4-Nitrophenol			1.1 U	1.6 U	1 U	1 U
Acenaphthene	3.5	0.016	*0.43 U*	*0.64 U*	*0.4 U*	*0.4 U*
Acenaphthylene	1.9		0.43 U	0.64 U	0.4 U	0.4 U
Anthracene	2.1		0.43 U	0.64 U	0.4 U	0.4 U
Benzo(a)anthracene	5		0.43 U	0.045 J	0.4 U	0.4 U
Benzo(a)pyrene	7	0.43	0.43 U	0.045 J	0.4 U	0.4 U
Benzo(b)fluoranthene			0.43	0.058 J	0.4 U	0.4 U
Benzo(k)fluoranthene			0.43	0.042 J	0.4 U	0.4 U
Total Benzofluoranthenes	11		0.86	0.1 J	0.4 U	0.4 U
Benzo(g,h,i)Perylene	1.2		0.43 U	0.64 U	0.4 U	0.4 U

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Table 2 - Analytical Results for Freshwater Sediment Samples
Gorst Landfill
Gorst, Washington

Table 2f - Semivolatile Organic Compounds

Sample ID / Sample Date			GL-SED-01	GL-SED-02	GL-SED-03	GL-SED-04
			1/10/2000	1/11/2000	1/11/2000	1/11/2000
SVOCs in mg/kg	FSQV[a]	EcoTox Thresholds[b]				
Bis(2-Chloroethoxy)Methane			0.43 U	0.64 U	0.4 U	0.4 U
Bis(2-Chloroethyl)Ether			0.43 U	0.64 U	0.4 U	0.4 U
Bis(2-Ethylhexyl)Phthalate	0.64		0.43 U	0.64 U	0.4 U	0.4 U
Butylbenzylphthalate		11	0.43 U	0.095 J	0.4 U	0.4 U
Carbazole	0.14		*0.43 U*	*0.64 U*	*0.4 U*	*0.4 U*
Chrysene	7.4		0.43 U	0.073 J	0.4 U	0.4 U
Di-N-Butylphthalate		11	0.43 U	0.03 J	0.4 U	0.4 U
Di-N-Octylphthalate			0.43 U	0.027 J	0.4 U	0.4 U
Dibenz(a,h)anthracene	0.23		*0.43 U*	*0.64 U*	*0.4 U*	*0.4 U*
Dibenzofuran		2.0	0.43 U	0.64 U	0.4 U	0.4 U
Diethylphthalate		0.63	0.43 U	0.64 U	0.4 U	0.4 U
Dimethylphthalate			0.43 U	0.64 U	0.4 U	0.4 U
Fluoranthene	11	0.6	0.43 U	0.097 J	0.4 U	0.4 U
Fluorene	3.6	0.54	0.43 U	*0.64 U*	0.4 U	0.4 U
Hexachlorobenzene			0.43 U	0.64 U	0.4 U	0.4 U
Hexachlorobutadiene			0.43 U	0.64 U	0.4 U	0.4 U
Hexachlorocyclopentadiene			0.43 U	0.64 U	0.4 U	0.4 U
Hexachloroethane		1.0	0.43 U	0.64 U	0.4 U	0.4 U
Indeno(1,2,3-cd)pyrene	0.73		0.43 U	0.045 J	0.4 U	0.4 U
Isophorone			0.43 U	0.64 U	0.4 U	0.4 U
N-Nitroso-Di-N-Propylamine			0.43 U	0.64 U	0.4 U	0.4 U
N-Nitrosodiphenylamine			0.43 U	0.64 U	0.4 U	0.4 U
Naphthalene	37	0.16	*0.43 U*	*0.64 U*	*0.4 U*	*0.4 U*
Nitrobenzene			0.43 U	0.64 U	0.4 U	0.4 U
Pentachlorophenol			1.1 U	0.036 J	1 U	1 U
Phenanthrene	5.7	0.24	*0.43 U*	0.06 J	*0.4 U*	*0.4 U*
Phenol			0.43 U	0.64 U	0.4 U	0.4 U
Pyrene	9.6	0.66	0.43 U	0.097 J	0.4 U	0.4 U
LPAHs	27		0.43 U	0.06	0.4 U	0.4 U
HPAHs	36		0.43 U	0.502	0.4 U	0.4 U
Total PAHs	60	4.0	0.43 U	0.562	0.4 U	0.4 U

Italicized reporting limits are greater than at least one screening criteria.

(a) Washington State Department of Ecology, Creation and Analysis of Freshwater Sediment Quality Values in Washington State, July 1997.

(b) Lowest Sediment Criteria presented in Ecotox Thresholds, (EPA, 1996).

U Not detected at indicated detection limit. J Estimated value.

Table 3 - Analytical Results for Groundwater Samples
Gorst Landfill
Gorst, Washington

Table 3a - PCBs

Sample ID / **Sample Date**		GL-GW-BR11 / 1/14/2000	GL-GW-BR12 / 1/14/2000
PCBs in µg/L	**MTCA Method B**		Field Duplicate of GL-GW-BR11
Aroclor 1016	1.12	1 U	1 U
Aroclor 1221		1 U	1 U
Aroclor 1232		1 U	1 U
Aroclor 1242		1 U	1 U
Aroclor 1248		1 U	1 U
Aroclor 1254	0.32	*1 U*	*1 U*
Aroclor 1260		1 U	1 U
Total Aroclors	0.0114	*1 U*	*1 U*

Italicized reporting limits are greater than screening criteria.
U Not detected at indicated detection limit.

Table 3 - Analytical Results for Groundwater Samples
Gorst Landfill
Gorst, Washington

Table 3b - Priority Pollutant Metals

Sample-ID Sample Date		GL-GW-BR-11 1/14/2000		GL-GW-BR-12 1/14/2000	
				Field Duplicate of GL-GW-BR11	
Metals in µg/L	**MTCA Method B**	**Total**	**Dissolved**	**Total**	**Dissolved**
Antimony	6.4	*50 U*	*50 U*	*50 U*	*50 U*
Arsenic	0.005	*5 U*	*5 U*	*5 U*	*5 U*
Beryllium	0.02	*5 U*	*5 U*	*5 U*	*5 U*
Cadmium	8	5 U	5 U	5 U	5 U
Chromium	80	10 U	10 U	10 U	10 U
Copper	592	10 U	10 U	10 U	10 U
Lead		3 U	3 U	3 U	3 U
Mercury	4.8	0.2 U	0.2 U	0.2 U	0.2 U
Nickel	320	10 U	10 U	10 U	10 U
Selenium	80	5 U	5 U	5 U	5 U
Silver	80	10 U	10 U	10 U	10 U
Thallium	1.12	*5 U*	*5 U*	*5 U*	*5 U*
Zinc	4,800	10 U	10 U	10 U	10 U

Italicized reporting limits are greater than screening criteria.
U Not detected at indicated detection limit.

e 3 - Analytical Results for Groundwater Samples
Gorst Landfill
Gorst, Washington

Table 3c - Volatile Organic Compounds

Sample-ID Sample Date		GL-GW-BR-11 1/14/2000	GL-GW-BR-12 1/14/2000	GL-TB-01
VOCs in µg/L	MTCA Method B		Field Duplicate of GL-GW-BR11	
1,1,1-Trichloroethane	7,200	10 U	10 U	10 U
1,1,2,2-Tetrachloroethane	0.22	*10 U*	*10 U*	*10 U*
1,1,2-Trichloroethane	0.77	*10 U*	*10 U*	*10 U*
1,1-Dichloroethane	800	10 U	10 U	10 U
1,1-Dichloroethene	0.073	*10 U*	*10 U*	*10 U*
1,2-Dichloroethane	0.48	*10 U*	*10 U*	*10 U*
1,2-Dichloroethene (Total)	240	10 U	10 U	10 U
1,2-Dichloropropane	0.64	*10 U*	*10 U*	*10 U*
2-Butanone	4,800	10 U	10 U	10 U
2-Hexanone		10 U	10 U	10 U
4-Methyl-2-Pentanone	800	10 U	10 U	10 U
Acetone	800	10 U	10 U	10 U
Benzene	1.5	*10 U*	*10 U*	*10 U*
Bromodichloromethane	0.71	*10 U*	*10 U*	*10 U*
Bromoform	5.54	*10 U*	*10 U*	*10 U*
Bromomethane	11.2	10 U	10 U	10 U
Carbon Disulfide	800	10 U	10 U	10 U
Carbon Tetrachloride	0.34	*10 U*	*10 U*	*10 U*
Chlorobenzene	160	10 U	10 U	10 U
Chloroethane		10 U	10 U	10 U
Chloroform	7.17	*10 U*	*10 U*	*10 U*
Chloromethane	3.36	*10 U*	*10 U*	*10 U*
Cis-1,3-Dichloropropene		10 U	10 U	10 U
Dibromochloromethane	0.52	*10 U*	*10 U*	*10 U*
Ethylbenzene	800	10 U	10 U	10 U
Methylene Chloride	5.8	*10 U*	*2 J*	*10 U*
Styrene	1.46	*10 U*	*10 U*	*10 U*
Tetrachloroethene	0.86	*10 U*	*10 U*	*10 U*
Toluene	1,600	10 U	10 U	10 U
Trans-1,3-Dichloropropene		10 U	10 U	10 U
Trichloroethene	3.97	*10 U*	*10 U*	*10 U*
Vinyl Chloride	0.02	*10 U*	*10 U*	*10 U*
Xylene (Total)	1,600	10 U	10 U	10 U

Italicized reporting limits are greater than screening criteria.
(a) MTCA Criteria presented are sum of cis and trans 1,2-dichloroethene.

U Not detected at indicated detection limit.
J Estimated value.

Table 3 - Analytical Results for Groundwater Samples
Gorst Landfill
Gorst, Washington

Table 3d - Semivolatile Organic Compounds

Sample-ID Sample Date		GL-GW-BR-11 1/14/2000	GL-GW-BR-12 1/14/2000
SVOCs in µg/L	**MTCA Method B**		Field Duplicate of GL-GW-BR11
1,2,4-Trichlorobenzene	80	10 U	10 U
1,2-Dichlorobenzene	720	10 U	10 U
1,3-Dichlorobenzene		10 U	10 U
1,4-Dichlorobenzene	1.8	*10 U*	*10 U*
2,2'-Oxybis(1-Chloropropane)	1.25	*10 U*	*10 U*
2,4,5-Trichlorophenol	1,600	25 U	25 U
2,4,6-Trichlorophenol	7.95	*10 U*	*10 U*
2,4-Dichlorophenol	48	10 U	10 U
2,4-Dimethylphenol	320	10 U	10 U
2,4-Dinitrophenol	32	25 U	25 U
2,4-Dinitrotoluene	32	10 U	10 U
2,6-Dinitrotoluene	16	10 U	10 U
2-Chloronaphthalene	1,280	10 U	10 U
2-Chlorophenol	80	10 U	10 U
2-Methylnaphthalene		10 U	10 U
2-Methylphenol	800	10 U	10 U
2-Nitroaniline		25 U	25 U
2-Nitrophenol		10 U	10 U
3,3'-Dichlorobenzidine	0.19	*10 U*	*10 U*
3-Nitroaniline		25 U	25 U
4,6-Dinitro-2-Methylphenol		25 U	25 U
4-Bromophenyl-Phenylether		10 U	10 U
4-Chloro-3-Methylphenol		10 U	10 U
4-Chloroaniline	64	10 U	10 U
4-Chlorophenyl-Phenylether		10 U	10 U
4-Methylphenol	80	10 U	10 U
4-Nitroaniline		25 U	25 U
4-Nitrophenol		25 U	25 U
Acenaphthene	960	10 U	10 U
Acenaphthylene		10 U	10 U
Anthracene	4,800	10 U	10 U
Benzo(a)anthracene	0.012	*10 U*	*10 U*
Benzo(a)pyrene	0.012	*10 U*	*10 U*
Benzo(b)fluoranthene	0.012	*10 U*	*10 U*
Benzo(g,h,i)perylene		10 U	10 U

ɹle 3 - Analytical Results for Groundwater Samples
Gorst Landfill
Gorst, Washington

Table 3d - Semivolatile Organic Compounds

Sample-ID **Sample Date**		**GL-GW-BR-11** 1/14/2000	**GL-GW-BR-12** 1/14/2000
SVOCs in µg/L	**MTCA Method B**		Field Duplicate of GL-GW-BR11
Benzo(k)fluoranthene	0.012	*10 U*	*10 U*
Bis(2-Chloroethoxy)Methane		10 U	10 U
Bis(2-Chloroethyl)Ether	0.04	*10 U*	*10 U*
Bis(2-Ethylhexyl)Phthalate	6.25	*10 U*	*10 U*
Butylbenzylphthalate	3,200	10 U	10 U
Carbazole	4.38	*10 U*	*10 U*
Chrysene	0.012	*10 U*	*10 U*
Di-N-Butylphthalate	1,600	10 U	10 U
Di-N-Octylphthalate	320	10 U	10 U
Dibenz(a,h)anthracene	0.012	*10 U*	*10 U*
Dibenzofuran		10 U	10 U
Diethylphthalate	12,800	10 U	10 U
Dimethylphthalate	16,000	10 U	10 U
Fluoranthene	640	10 U	10 U
Fluorene	640	10 U	10 U
Hexachlorobenzene	0.05	*10 U*	*10 U*
Hexachlorobutadiene	0.56	*10 U*	*10 U*
Hexachlorocyclopentadiene	112	10 U	10 U
Hexachloroethane	6.25	*10 U*	*10 U*
Indeno(1,2,3-cd)pyrene	0.012	*10 U*	*10 U*
Isophorone	92	10 U	10 U
N-Nitroso-Di-N-Propylamine	0.013	*10 U*	*10 U*
N-Nitrosodiphenylamine	17.9	10 U	10 U
Naphthalene	320	10 U	10 U
Nitrobenzene	8	*10 U*	*10 U*
Pentachlorophenol	0.73	*25 U*	*25 U*
Phenanthrene		10 U	10 U
Phenol	9,600	10 U	10 U
Pyrene	480	10 U	10 U

Italicized reporting limits are greater than screening criteria.
U Not detected at indicated detection limit.

Table 4 - Analytical Results for Surface Water Samples
Gorst Landfill
Gorst, Washington

Table 4a - PCBs

Sample ID Sample Date			GL-SW-01 1/10/2000	GL-SW-02 1/11/2000
PCBs in µg/L	MTCA Method B	Surface Water Quality Standards [(a)]		
Aroclor 1016			1 U	1 U
Aroclor 1221			1 U	1 U
Aroclor 1232			1 U	1 U
Aroclor 1242			1 U	1 U
Aroclor 1248			1 U	1 U
Aroclor 1254			1 U	1 U
Aroclor 1260			1 U	1 U
Total Aroclors	0.000027	0.014	*1 U*	*1 U*

Italicized reporting limits are greater than at least one screening criteria.

(a) Water Quality Standards for Surface Waters of the State of Washington, Chronic Criteria (WAC 173-201A) and Freshwater Chronic Criteria (EPA, 1999).

U Not detected at indicated detection limit.

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Table 4 - Analytical Results for Surface Water Samples
Gorst Landfill
Gorst, Washington

Table 4b - Priority Pollutant Metals

Sample-ID / Sample Date			GL-SW-01 1/10/2000		GL-SW-02 1/11/2000	
Metals in µg/L	MTCA Method B	Surface Water Quality Standards (dissolved) [a]	Total	Dissolved	Total	Dissolved
Antimony			50 U	50 U	50 U	50 U
Arsenic	0.098	190	*5 U*	*5 U*	*5 U*	*5 U*
Beryllium	0.079		*5 U*	*5 U*	*5 U*	*5 U*
Cadmium [b]	20.3	0.19	*5 U*	*5 U*	*5 U*	*5 U*
Chromium (as VI)		10	10 U	10 U	10 U	10 U
Copper [b]	2,665	2	*10 U*	*10 U*	*10 U*	*10 U*
Lead [b]		0.2	*3 U*	*3 U*	*3 U*	*3 U*
Mercury		0.012	*0.2*	*0.2 U*	*0.2 U*	*0.2 U*
Nickel [b]	1,100	23	*10 U*	*10 U*	*10 U*	*10 U*
Selenium		5	5 U	5 U	5 U	5 U
Silver [b]	25,900	0.07	10 U	10 U	10 U	10 U
Thallium	1.56		*5 U*	*5 U*	*5 U*	*5 U*
Zinc [b]	16,500	15	10 U	10 U	10 U	10 U

Italicized reporting limits are greater than at least one screening criteria.

(a) Water Quality Standards for Surface Waters of the State of Washington, Chronic Criteria (WAC 173-201A).

(b) Criteria have been corrected for hardness, where appropriate. Hardness used in surface water calculations is an average for the two samples of 10.3

U Not detected at indicated detection limit.

e 4 - Analytical Results for Surface Water Samples
Gorst Landfill
Gorst, Washington
Table 4c - Volatile Organic Compounds

Sample-ID Sample Date			GL-SW-01 1/10/2000	GL-SW-02 1/11/2000
VOCs in µg/L	**MTCA Method B**	**EcoTox Thresholds[a]**		
1,1,1-Trichloroethane	416,666	62	10 U	10 U
1,1,2,2-Tetrachloroethane	6.48	420	*10 U*	*10 U*
1,1,2-Trichloroethane	25.3		10 U	10 U
1,1-Dichloroethane			10 U	10 U
1,1-Dichloroethene	1.93		*10 U*	*10 U*
1,2-Dichloroethane	59		10 U	10 U
1,2-Dichloroethene (Total)			10 U	10 U
1,2-Dichloropropane	23		10 U	10 U
2-Butanone			10 U	10 U
2-Hexanone			10 U	10 U
4-Methyl-2-Pentanone			10 U	10 U
Acetone			10 U	10 U
Benzene	43		10 U	10 U
Bromodichloromethane	28		10 U	10 U
Bromoform	219		10 U	10 U
Bromomethane	968		10 U	10 U
Carbon Disulfide			10 U	10 U
Carbon Tetrachloride	2.66		*10 U*	*10 U*
Chlorobenzene	5,034	130	10 U	10 U
Chloroethane			10 U	10 U
Chloroform	6,914		10 U	10 U
Chloromethane	133		10 U	10 U
Cis-1,3-Dichloropropene			10 U	10 U
Dibromochloromethane	20.6		10 U	10 U
Ethylbenzene	6,914	290	10 U	10 U
Methylene Chloride	960		10 U	10 U
Styrene			10 U	10 U
Tetrachloroethene	4.15	120	*10 U*	*10 U*
Toluene	48,460	130	10 U	10 U
Trans-1,3-Dichloropropene			10 U	10 U
Trichloroethene	55.6	350	10 U	10 U
Vinyl Chloride	2.9		*10 U*	*10 U*
Xylene (Total)			10 U	10 U

Italicized reporting limits are greater than at least one screening criteria.
[a] Ecotox Tier II Thresholds, (EPA, 1996).

U Not detected at indicated detection limit.
J Estimated value.

Table 4 - Analytical Results for Surface Water Samples
Gorst Landfill
Gorst, Washington

Table 4d - Semivolatile Organic Compounds

Sample-ID Sample Date			GL-SW-01 1/10/2000	GL-SW-02 1/11/2000
SVOCs in µg/L	MTCA Method B	EcoTox Thresholds[a]		
1,2,4-Trichlorobenzene	227	110	10 U	10 U
1,2-Dichlorobenzene	4,197	14	10 U	10 U
1,3-Dichlorobenzene		71	10 U	10 U
1,4-Dichlorobenzene	4.86	15	*10 U*	*10 U*
2,2'-Oxybis(1-Chloropropane)			10 U	10 U
2,4,5-Trichlorophenol			25 U	25 U
2,4,6-Trichlorophenol	3.93		*10 U*	*10 U*
2,4-Dichlorophenol	191		10 U	10 U
2,4-Dimethylphenol	553		10 U	10 U
2,4-Dinitrophenol	3,457		25 U	25 U
2,4-Dinitrotoluene	1,365		10 U	10 U
2,6-Dinitrotoluene			10 U	10 U
2-Chloronaphthalene			10 U	10 U
2-Chlorophenol	97		10 U	10 U
2-Methylnaphthalene			10 U	10 U
2-Methylphenol			10 U	10 U
2-Nitroaniline			25 U	25 U
2-Nitrophenol			10 U	10 U
3,3'-Dichlorobenzidine	0.046		*10 U*	*10 U*
3-Nitroaniline			25 U	25 U
4,6-Dinitro-2-Methylphenol			25 U	25 U
4-Bromophenyl-Phenylether		1.5	*10 U*	*10 U*
4-Chloro-3-Methylphenol			10 U	10 U
4-Chloroaniline			10 U	10 U
4-Chlorophenyl-Phenylether			10 U	10 U
4-Methylphenol			10 U	10 U
4-Nitroaniline			25 U	25 U
4-Nitrophenol			25 U	25 U
Acenaphthene	643		10 U	10 U
Acenaphthylene			10 U	10 U
Anthracene	25,926		10 U	10 U
Benzo(a)anthracene	0.03		*10 U*	*10 U*
Benzo(a)pyrene	0.03	0.014	*10 U*	*10 U*
Benzo(b)fluoranthene	0.03		*10 U*	*10 U*
Benzo(g,h,i)perylene			10 U	10 U
Benzo(k)fluoranthene	0.03		*10 U*	*10 U*
Bis(2-Chloroethoxy)Methane			10 U	10 U
Bis(2-Chloroethyl)Ether	0.85		*10 U*	*10 U*
Bis(2-Ethylhexyl)Phthalate	3.56	32	*10 U*	*10 U*
Butylbenzylphthalate	1,252	19	10 U	10 U

Table 4 - Analytical Results for Surface Water Samples
Gorst Landfill
Gorst, Washington

Table 4d - Semivolatile Organic Compounds

Sample ID Sample Date			GL-SW-01 1/10/2000	GL-SW-02 1/11/2000
SVOCs in µg/L	MTCA Method B	EcoTox Thresholds[a]		
Carbazole			10 U	10 U
Chrysene	0.03		*10 U*	*10 U*
Di-N-Butylphthalate	2,913	33	10 U	10 U
Di-N-Octylphthalate			10 U	10 U
Dibenz(a,h)anthracene	0.03		10 U	10 U
Dibenzofuran		20	10 U	10 U
Diethylphthalate	28,412	220	10 U	10 U
Dimethylphthalate	72,016		10 U	10 U
Fluoranthene	90	8.1	*10 U*	*10 U*
Fluorene	3,457	3.9	*10 U*	*10 U*
Hexachlorobenzene	0.24		10 U	10 U
Hexachlorobutadiene	187		10 U	10 U
Hexachlorocyclopentadiene	4,182		10 U	10 U
Hexachloroethane	29.8	12	10 U	10 U
Indeno(1,2,3-cd)pyrene	0.03		10 U	10 U
Isophorone	1,558		10 U	10 U
N-Nitroso-Di-N-Propylamine	0.82		10 U	10 U
N-Nitrosodiphenylamine	9.73		10 U	10 U
Naphthalene	9,877	24	10 U	10 U
Nitrobenzene	449		10 U	10 U
Pentachlorophenol	4.9		*25 U*	*25 U*
Phenanthrene		6.3	*10 U*	*10 U*
Phenol	1,111,111		10 U	10 U
Pyrene	2,593		10 U	10 U

Italicized reporting limits are greater than at least one screening criteria.

(a) Ecotox Tier IIThresholds, (EPA, 1996).

U Not detected at indicated detection limit.

Table 5 - Analytical Results for Conventionals
Gorst Landfill
Gorst, Washington

Table 5a - Freshwater Sediment Samples

Sample ID	GL-SED-01	GL-SED-02	GL-SED-03	GL-SED-04
Sample Date	1/10/2000	1/11/2000	1/11/2000	1/11/2000
Moisture in %	23	48	18	18
Total Organic Carbon in mg/kg	9,240	36,200	5,190	3,410
Total Organic Carbon in %	0.924	3.62	0.519	0.341

Table 5b - Groundwater and Surface Water Samples

Sample-ID	GL-GW-BR-11	GL-GW-BR-12	GL-SW-01	GL-SW-02
Sample Date	1/14/2000	1/14/2000	1/10/2000	1/11/2000
Total Suspended Solids in mg/L	10 U	10 U	10 U	10 U

U Not detected at indicated detection limit.

Table 6 - Major Ion Distributions in Surface Water Samples
Gorst Landfill
Gorst, Washington

Sample-ID	**GL-SW-01**	**GL-SW-02**
Sample Date	1/10/2000	1/11/2000
Ions in mg/L		
Bicarbonate Alkalinity	10	12
Carbonate Alkalinity	5 U	5 U
Total Alkalinity	10	12
Calcium	1.78	2.83
Chloride	1.69	1.69
Hardness	8.88	11.80
Iron	0.22	0.22
Magnesium	1.08	1.16
Manganese	0.01 U	0.01 U
Nitrate/Nitrite as Nitrogen	0.11	0.10
Potassium	0.49	0.48
Sodium	1.82	1.79
Sulfate	2.26	2.89
Total Suspended Solids	10 U	10 U

U Not detected at indicated detection limit.